

**UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK**

IN RE ELECTRONIC BOOKS
ANTITRUST LITIGATION

)
)
) No. 11-md-02293 (DLC)
) ECF Case
)
) Judge Denise Cote
)

On Behalf of Apple Inc.

**Declaration of
JOSEPH P. KALT, Ph.D.
Compass Lexecon**

November 15, 2013

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I. INTRODUCTION

A. Witness Background and Qualifications

1. My name is Joseph P. Kalt. I am the Ford Foundation Professor Emeritus of International Political Economy at the John F. Kennedy School of Government at Harvard University. I am also a senior economist with Compass Lexecon, an economics consulting firm with offices in various cities throughout North America, South America, and Europe.
2. I hold B.A., M.A., and Ph.D. degrees in economics and I specialize in the economics of competition, antitrust, and regulation. Throughout my professional career, I have conducted research, published, taught, consulted, and testified extensively on the economics of industrial market structure, contracting, regulation, pricing, and strategic performance, with particular emphasis on industrial organization and antitrust economics.
3. At Harvard University, I served as an Instructor, Assistant Professor, and Associate Professor in the Department of Economics from 1978-1986, prior to joining the faculty of the Kennedy School of Government as a Professor with tenure in 1986. The Kennedy School is Harvard's graduate school for public policy and public administration.
 - a) In the Department of Economics at Harvard, I had primary responsibility for teaching the graduate and undergraduate courses in the economics of regulation and antitrust.
 - b) At the Kennedy School, my teaching responsibilities have included the economics of regulation and antitrust, economics for public policy, natural resource and environmental policy, and economic development on American Indian reservations. I have also served as Chair of the Economics and Quantitative Methods Program, Faculty Chair and Academic Dean for Research, Chair of Teaching Programs, and Chair of Ph.D. Programs.
4. From 2005-2009, I served as a visiting Professor at the Eller College of Management at the University of Arizona, where I taught courses in the economics of regulation and antitrust and in economic development. Since 2008, I have served as a Visiting Professor at the Rogers College of Law at the University of Arizona.
5. In the course of my academic and consulting experience I have extensively studied the economics of industrial organization, antitrust analysis, public goods, regulation and industrial oversight, and the principles of sound public policy. In addition to my university teaching, I have taught on such matters to

federal administrative law judges, elected and appointed federal, state and local officials, working journalists, and other mid-career audiences.

6. I have provided expert testimony on these issues before state, federal, and international tribunals, as well as before the United States Congress. A number of the matters indicated in my curriculum vita have employed the types of economic reasoning and analyses that bear upon the dispute at hand. These include issues of: competition and antitrust; industry structure, pricing, and marketing; and regulation across industries ranging from petroleum, food products, and transportation to financial services, communications, and computer technology.
7. My curriculum vita is attached hereto (see Appendix C) and lists my prior testimony as an expert and my publications.

B. Purpose of Analysis

8. I have been retained in this matter by Defendant Apple Inc. (“Apple”). I have been asked to assess the economics of Plaintiffs’ claims of antitrust injury and monetary damage purportedly suffered by the proposed Plaintiff class members in the Non-Litigating Jurisdictions¹ and by consumers in the Litigating Jurisdictions² as a result of conduct by Apple and the so-called Publisher Defendants³ that this Court has found to constitute unlawful restraint of trade under Section 1 of the Sherman Act and congruent state antitrust

¹ “The ‘Non-Litigating Jurisdictions’ are American Samoa, California, Florida, Georgia, Guam, Hawaii, Kentucky, Maine, Minnesota, Mississippi, Montana, Nevada, New Hampshire, New Jersey, North Carolina, Northern Mariana Islands, Oklahoma, Oregon, Rhode Island, South Carolina, U.S. Virgin Islands, Washington, and Wyoming. Excluded from the Class are Defendants, their employees, co-conspirators, officers, directors, legal representatives, heirs, successors, and wholly or partly owned subsidiaries of affiliated companies, as well as the Honorable Denise L. Cote and persons described in 28 U.S.C. § 455(b)(4)-(5).” See Plaintiffs’ Memorandum of Law in Support of Class Plaintiffs’ Motion for Class Certification and Appointment of Class Counsel, this matter, October 11, 2013 (“Class Certification Motion”), at 4.

² The “Litigating Jurisdictions” are Texas, Connecticut, Alabama, Alaska, Arizona, Arkansas, Colorado, Delaware, District of Columbia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Massachusetts, Michigan, Missouri, Nebraska, New Mexico, New York, North Dakota, Ohio, Pennsylvania, Puerto Rico, South Dakota, Tennessee, Utah, Vermont, Virginia, West Virginia, and Wisconsin. See In Re Electronic Book Antitrust Litigation 11-md-02293 (DLC), [Proposed] Second Amended Complaint for Injunctive Relief, Civil Penalties & As Parens Patriae on Behalf of Consumers, May 11, 2012 (“States Second Amended Complaint”), this matter, at 2.

³ The Publisher Defendants are Hachette Book Group, Inc. (“Hachette”), HarperCollins Publishers LLC (“HarperCollins”), Holtzbrinck Publishers LLC d/b/a Macmillan (“Macmillan”), Penguin Group (USA), Inc. (“Penguin”), and Simon & Schuster, Inc. (“Simon & Schuster”).

statutes.⁴ I have been specifically asked to address whether antitrust injury and the amount of damages can be established for each e-book purchaser by predominantly common proof.

9. Plaintiffs now propose to certify a class consisting of: “All persons in the Non-Litigating Jurisdictions who purchased ebooks between April 1, 2010 and May 21, 2012, published by Hachette Book Group, Inc. (‘Hachette’), HarperCollins Publishers LLC (‘HarperCollins’), Holtzbrinck Publishers, LLC d/b/a Macmillan (‘Macmillan’), Penguin Group (USA) Inc. (‘Penguin’), or Simon & Schuster, Inc. (‘Simon & Schuster’) directly from that publisher (including any of its imprints) after the adoption of the agency model by that publisher (including any of its imprints) after the adoption of the agency model by that publisher.”⁵
10. I have been asked to focus my analysis, in particular, on the Declaration of Plaintiffs’ expert, Prof. Roger G. Noll. Specifically, Prof. Noll presents a calculation of aggregate damages to the proposed class and to the consumers in the Litigating Jurisdictions, and asserts: (1) that his analysis demonstrates that common proof shows that anticompetitive harm (injury) has been suffered by virtually all consumers and (2) that damages to individual consumers can also be calculated by a method that is common (to the class and to the non-class plaintiffs).⁶
11. I have also been asked to assess the implications of my analyses for the fact and magnitude of claimed antitrust injury and damage in the aggregate and individually to the consumers of e-books represented in this litigation by the putative class and the litigating state jurisdictions. Finally, I have been asked to address the extent to which Prof. Noll’s methodology and conclusions (whether related to injury or damage, individual or aggregate) are speculative, unreliable, or otherwise unreasonable as a matter of economics.

C. Summary of My Findings

12. Book titles are exceedingly heterogeneous, and they are sold to consumers who are highly diverse in what they find attractive to read at any particular time. As I show in Section III below, the economic data in the matter at hand reveal pervasive dispersion and “churning” (i.e., prices moving up and down

⁴ Opinion and Order in *United States v. Apple*, No. 12-cv-2826 (S.D.N.Y.), July 10, 2013 (“July 10 Order”) at 159.

⁵ The First Amended Consolidated Class Action Complaint, this matter, October 23, 2013 (“Amended Complaint”) at ¶212.

⁶ Corrected Declaration of Roger G. Noll, this matter, October 21, 2013 (“Noll Declaration”) at 6-7.

both absolutely and relatively) of e-book prices across consumers' purchases. The American Bar Association has noted the implications of the kind of dispersion and churning that we see in e-book prices: "Generally, when the prices for some customers are going up while the prices of other customers are not, there is reason to doubt that the different customers (class members) are experiencing a common impact."⁷

13. Plaintiffs' expert Prof. Noll's modeling to explain e-book prices and his attendant calculations of aggregate damages and class member-specific damage formulas are plagued by his inability to control for the demonstrable dispersion and churning evident in the prices paid by consumers. For this reason, they do not constitute reliable or reasonable economic conclusions. As I show in Section V, Prof. Noll's attempt to control for the demonstrable variations in e-book prices with measurable, systematic data that do not require further individualized inquiry proves to be inadequate. His regression relies on a modeling strategy of excessively aggregating thousands, if not tens of thousands, of titles encompassing even hundreds of thousands of consumers' purchases into groupings based on four genre-like categorizations of titles,⁸ New York Times bestseller status, whether the corresponding print book is available in hardcover and/or paperback, and time since release.

- a) There is demonstrable and pervasive dispersion and churning of e-book prices within Prof. Noll's groupings. Thus, these groupings do not control for the kinds of forces known to affect consumers actual purchase decisions over the specific books that they buy. These forces include: Authors' growing or shrinking reputations; the appearance of good or bad reviews; events such as a movie release of a title; so-called "buzz" and "word-of-mouth" effects; celebrity, expert, or other endorsements; and real-time advertising and other marketing efforts by retailers, authors and/or publishers.
- b) Moreover, as I explain in Section IV, Prof. Noll's aggregated analysis fails to consider the situations of consumers who obtained benefits from agency and Apple's entry into e-book retailing (benefits that would be absent in the but-for world). These benefits demonstrably arose through, for example, increases in access to e-books on Apple's iBookstore, increases in self-published titles, and lower prices of e-reading devices. Prof. Noll also ignores individual settlement payments to the extent they are collected by individual consumers.

⁷ *Econometrics: Legal, Practical and Technical Issue*, American Bar Association Section of Antitrust Law (2005) ("ABA Section of Antitrust Law (2005)") at 210.

⁸ Plus two groupings characterized only as "other" and "unidentified".

14. Prof. Noll's modeling, calculations, and opinions thus do not suffice to identify an economic basis for proving the fact, much less the magnitude, of antitrust injury on a predominantly common basis. This failing is exacerbated by Prof. Noll's use of and dependence on gross averages of the many prices consumers pay. His basic units of observation are his calculations of four-week average prices for each title. This averaging conceals demonstrable variation in actual transaction prices that occur around his averages. Moreover, his calculation of percentage overcharges is derived from an average for the typically-very-large number of titles and transactions in his gross groupings. Thus, because of this focus on average prices and the calculation of average overcharges on the basis of clearly overbroad groupings, Prof. Noll's framework yields a highly unreliable method for assessing the fact and magnitude of individual and aggregate class-wide damages.
15. In fact, as I show in Sections IV and V, Prof. Noll's modeling and calculations (perhaps unwittingly) assume his conclusion of common injury. That is, Prof. Noll's methodology rests on the premise that any given individual's e-book purchase on a given day from a given retailer is subject to the average overcharge for the (overbroad) grouping into which Prof. Noll has put that purchase. Assuming what needs to be proved (i.e., that the individual's specific experience conforms to the average of the group's experience) is a fundamental methodological error. In this case, the error in itself renders Prof. Noll's calculations of the fact and magnitude of injury unreliable. As I report in Section V, the conditions that would be required to support Prof. Noll's *assumption* of a common fact of injury are not supported by evidence from the marketplace or by Prof. Noll's own analysis.⁹
16. The lack of factual support for Prof. Noll's assumption of a common fact of injury and the lack of reliability in his damages calculations show up clearly in the output of his modeling. In Sections IV and V, for example, I show that his calculations of but-for prices (i.e., but-for the unlawful conduct) are neither economically rational nor consistent with Plaintiffs' theory of liability (which entails a return to pre-agency pricing). Prof. Noll's but-for prices, in effect, merely down-shift actual transaction prices in the post-agency world.
 - a) In reality, a very large number of transaction prices did not rise following the onset of agency marketing by Publisher Defendants. This leaves Prof. Noll needing to tell a "just so" story: In April 2010, it just

⁹ I accept for the purposes of my analysis contained herein that the Court has found the relevant market to be "trade e-books sold in the United States." July 10 Order at 121, fn 60: "Plaintiffs have defined the relevant market as trade e-books in the United States; Apple does not dispute that characterization."

so happens that retailers operating under wholesale marketing were about to drop their prices absent the unlawful conduct, a development that was precisely offset by the onset of agency, leaving observed prices unchanged. The inability of Prof. Noll's modeling to explain but-for prices in a coherent manner that is consistent with Plaintiffs' liability theory tells us that his modeling has not isolated whatever effects the unlawful conduct may have had on e-book prices. This renders his modeling unreliable as a means of identifying both aggregate and consumer-specific injury and damages.

b) In addition, I find and report in Section V that Prof. Noll's modeling results are unreliable and plagued with millions of false positives (i.e., reporting injury where none can be reliably determined).

17. In conclusion, I find that the Prof. Noll's analysis does not demonstrate that common proof shows that anticompetitive harm (injury) has been suffered by virtually all consumers or that damages to individual consumers can be calculated by a method that is common (to either the class or to the non-class Plaintiffs). I further find that Prof. Noll's methodology and conclusions (whether related to injury or damage, individual or aggregate) are speculative, unreliable, or otherwise unreasonable as a matter of economics. Overcoming these failings would require, at the very least, a highly individualized inquiry into the circumstances of individual consumer transactions.

D. Materials Considered

18. In addition to my professional training, my teaching and research, and my prior consulting experience, I and my staff working under my direction have examined extensive materials and evidence in the course of my engagement in the matter at hand. Among the items I and my staff have reviewed are:

- a) Legal filings and pleadings in this matter;
- b) Data and other information produced by the parties in this lawsuit and by others;
- c) Publicly available data and other information regarding various aspects of the marketplace, especially those pertaining to the analytic issues raised by the parties in this lawsuit and *United States v. Apple*, No. 12-cv-2826 (S.D.N.Y.);
- d) The Corrected Declaration on behalf of Plaintiffs in this matter by Prof. Roger G. Noll; and
- e) Deposition, trial, and written testimony in *United States v. Apple*, No. 12-cv-2826 (S.D.N.Y.).

19. A listing of the specific data and documents I rely upon in my analysis for this declaration is included in Appendix B.
20. I am being compensated for my work on this matter at a rate of \$1350 per hour, and my compensation is not dependent upon the outcome of this dispute. If appropriate, the analysis in this declaration may be supplemented if additional information and data become available, and I also may provide additional economic analysis in response to any subsequent Plaintiff expert reports, depositions of those experts, and/or receipt through discovery of further information, as permitted by the Court.

II. OVERVIEW: PLAINTIFF'S CLAIMS AND ALLEGATIONS

21. Class Plaintiffs allege that: "Defendants...have entered into an unlawful agreement, combination and conspiracy in restraint of trade. Specifically, Defendants have unlawfully agreed to artificially inflate the retail price range of eBooks by switching to an Agency model in which eBook prices are determined using a common formula across individual books and publishers."¹⁰
 - a) The Plaintiff States charge Macmillan, Penguin, and Apple (collectively referred by Plaintiff States as "Defendants") "with entering into contracts, combinations, and conspiracies that restrain trade."¹¹ Defendants' and additional Conspiring Publishers' actions are alleged to have "increased e-book retail prices pursuant to [an] illegal agreement" to "eliminate e-book retail price competition."¹²
 - b) As noted, the Court has found that Apple and the Publisher Defendants engaged in a restraint of trade in connection with marketing their electronic books ("e-books") under a so-called "agency" model in which individual publishers would set the prices of their respective e-book titles sold via online retailers such as Amazon, Apple's iBookstore, and others. In 2010, Publisher Defendants moved from the "wholesale" model under which retailers such as Apple, Amazon, and

¹⁰ Amended Complaint at ¶221.

¹¹ States Second Amended Complaint at ¶1.

¹² States Second Amended Complaint at ¶4. Conspiring Publishers are defined as Macmillan, Penguin, Hachette, HarperCollins and Simon & Schuster. States Second Amended Complaint at ¶2.

others purchased e-book titles from the Publisher Defendants (and others) and then priced and sold such titles to the consuming public.¹³

c) In light of the Court's finding of a Section 1 conspiracy in restraint of trade, Plaintiffs assert that "Apple's conspiracy raised the Publisher Defendants' e-book prices and what remains is a formulaic calculation of the damage to consumers Apple caused."¹⁴

22. Plaintiffs are suing "on behalf of a class of persons...in the Non-Litigating Jurisdictions who purchased eBooks between April 1, 2010 and May 21, 2012, published by [Publisher Defendants] directly from that publisher (including any of its imprints) after the adoption of the agency model by that publisher".¹⁵ The Plaintiff States seek "injunctive relief and as parens patriae on behalf of consumers, and under the laws of their respective states..."¹⁶

23. Plaintiffs assert that the objective *and* "effect" of the conspiracy was "to halt the discounting of eBook prices and *uniformly* raise prices on all first release fiction and nonfiction published by these Publisher Defendants".¹⁷ In addition, Plaintiffs claim that "the Publisher Defendants have restrained trade by coordinating their pricing to directly set retail prices higher than had existed in the previously competitive market".¹⁸

24. In support of these claims and allegations, Prof. Noll reports that economists working under his direction constructed a "before-after" statistical model (known as a "reduced-form pricing equation") of the pricing of Publisher Defendants' e-books, and that this model finds that, after the switch to agency marketing by Publisher Defendants, consumers in the alleged class¹⁹ and in the Litigating States suffered damages in the aggregate totaling \$307.8 million.²⁰

¹³ The agency model was employed by Apple with all publishers; it was employed by Amazon with the Publisher Defendants in 2010 and, in 2011, with Random House (Amended Complaint at ¶18, 27, 35, and 44). Both agency and wholesale models, however, continued to coexist post-April 2010. (See, for example, Deposition of Roger Noll, November 1, 2003 at 46:13 to 49:4).

¹⁴ Class Certification Motion at 3.

¹⁵ Amended Complaint at ¶212.

¹⁶ States Second Amended Complaint at ¶11.

¹⁷ Amended Complaint at ¶4, emphasis added.

¹⁸ Amended Complaint at ¶4.

¹⁹ Unless otherwise noted, my discussion of the alleged claims of the "class" and "class members", and of Prof. Noll's opinions relating to the class, should be taken to refer also to the alleged claims of the consumers represented by the Litigating States, since Plaintiffs and Prof. Noll do not differentiate among

- a) In reporting that he has found these damages, Prof. Noll opines that “successfully showing that consumers were damaged by paying supracompetitive prices demonstrates that they suffered anticompetitive harm.”²¹
- b) Prof. Noll further concludes that: “Because class members are defined as having purchased e-books from the Publisher Defendants during the period of the anticompetitive conduct, and because anticompetitive conduct by the defendants caused prices to be higher for e-books that account for 99.5 percent of e-book sales by the Publisher Defendants, I conclude that the requirement to show class-wide anticompetitive harm is satisfied.”²²
- c) Finally, regarding the ability of his modeling to determine damages to individual purchasers, Prof. Noll asserts that his “estimated [reduced-form regression] equation yields a formula for calculating the predicted price of each e-book title in each four-week period without the effect of the anticompetitive conduct.”²³ Apparently of the opinion that measuring actual and “but-for” (i.e., but-for the noted unlawful conduct) e-book prices on the basis of four-week averages is sufficiently accurate to yield reliable enough measures of the actual and but-for prices (and the differences between them) of the damages that a consumer may have realized at the specific time of a purchase within a subject four-week period, Prof. Noll then argues that the consumer’s “transactions records can be used to calculate damages for each e-book customer by summing the damages for each title that was purchased by that customer, thereby producing damages as well as proof of anticompetitive harm for every consumer in the class using a formula that is common to class members.”²⁴

them (other than to “disaggregate” state-level damage figures) and rely on pooled data to calculate their estimates.

²⁰ Noll Declaration at 7.

²¹ Noll Declaration at 6.

²² Noll Declaration at 6.

²³ Noll Declaration at 6.

²⁴ Noll Declaration at 6-7.

III. BACKGROUND: PERTINENT ECONOMICS OF THE BOOK PUBLISHING INDUSTRY

A. Overview

25. Plaintiffs have alleged in this case that all individuals who purchased an e-book from a Publisher Defendant following the conversion to agency marketing have been harmed because that conversion purportedly raised all Publisher Defendant e-book prices. To assess Plaintiffs' and Prof. Noll's claims, it is important to place those claims within the context of the industry, the nature of the products being sold, the complexity of how they are priced, and the choices available to industry participants.
26. Researchers who have studied book publishing describe the industry: "Book publishing in the United States in the twenty-first century is a frenetic, fast-paced world of thousands of publishing companies employing more than 95,000 individuals, issuing more than one million new titles annually, keeping over five million distinct titles in print, and generating approximately +\$27 billion annually in net publishers' revenues."²⁵
27. Improvements in technology – impacting the chain of production from publishing to online retailing and distribution to the experience of reading digitally formatted titles – have resulted in a fundamental economic reorganization of the marketplace for titles as authors increasingly self-publish, publishers retail their books, and retailers publish books.
 - a) According to these scholars, when it comes to the demand for any given book, "[t]here is stark uncertainty in the book business. Every book is in a tournament fighting for sales and attention against every other new and backlist book. So book publishing is geared to adapt, and adapt rather quickly. If a title falters, if exceptional efforts fail to trigger the sought-after 'buzz,' then it is likely that another book garners the attention of sales representatives and marketing executives, and in this business there is a veritable flood of new books."²⁶
 - b) Moreover, "[e]very book is a new product. Readers discover their preferences and spread information, both positive and negative, via the

²⁵ Greco, Milliot, and Wharton, *The Book Publishing Industry*, 3rd ed., Rutledge, 2011 ("Greco, *et al.*") at 5. Although this quote states that "more than one million new titles" are released annually, data presented by the authors of this work show that approximately 170,000 new titles were published on average each year in the United States from 2000-2011.

²⁶ Greco, *et al.* at 3.

‘information cascade.’ There is dual-sided uncertainty about every book. An author or editor does not know with any real precision prior to the publication date whether readers will find and enjoy a specific book, and readers do not know in advance whether they will enjoy a specific book. This means that editors and publishers gamble on whether a book will succeed in a busy market”.²⁷

B. Authors and Titles

28. For the purposes of this declaration, the book publishing industry in the United States can be broadly represented as consisting of four structural sectors: authors, publishers, retailers, and end-use consumers (such as individuals and libraries) who purchase books.
29. Authors write books (i.e., “titles”).²⁸ In so doing, each author faces numerous decisions and choices regarding the kind of title to write and how to publish, market, and sell the title once it is written. Take, for example, subject matter. Some authors write a book to inform or educate the reader, while others write a book to spark a debate or simply to entertain the reader.²⁹ While it is common for general trade press and other publications related to the book industry to broadly categorize titles between fiction and non-fiction, this demarcation greatly obscures differentiation across types of books, authors, titles, and delivery platforms (e.g., distinguishing between hardcover, paperback, and e-books; or between well-established and first-time authors).
 - a) In fact, there are many different genres, and even subgenres, of books that are recognized in the marketplace. Figure 1, for example, displays the array of [REDACTED] title genres as designated by Amazon in its course-of-business records. The genres, which range from [REDACTED] offer some insight into the rich diversity of preferences to be found within the book-buying public.
 - b) As comprehensive as the list may appear, however, even Figure 1 fails to illustrate the full range of diversity amongst consumer preferences across titles – and the resulting tailoring of titles in the marketplace as

²⁷ Greco, *et al.* at 3-4.

²⁸ For purposes of this declaration, a Publisher Defendant e-book title is defined as the title of a book produced by a given Publisher Defendant as sold through a given retailer.

²⁹ Greco, *et al.* at 4.

authors, editors, and publishers seek to reach consumers. For example, a genre as broad as “History” covers an immense range of subjects from, e.g., the Moghul Empires of ancient India to U.S. Civil War military strategy. Any individual consumers with strong interests in the former may or may not be willing to purchase the latter in the absence of appealing titles or acceptable prices on pre-modern Indian history. Similarly, “Teens” can and does contain titles with subject matter encompassing any of the other aforementioned genres, albeit “pitched” to a teenage readership. Within a broad genre of, say, “Fiction”, offerings range from the first-time output of a self-published struggling author to the much pre-publicized release of a new title by a widely recognized author with a record of bestsellers to her or his credit.

- c) Similarly, titles can reflect differing consumer desires even within a given genre across the range, for example, of single-issue releases to multi-volume series to award winning literature to mass market paperbacks. And, of course, the “story” the author tells may be delivered in print or digital, written, or audio formats.
30. The full range of diversity of titles – i.e., what authors write and what self-published authors, editors, and publishers choose to supply to the marketplace – is manifested by the extensive database of e-book transactions made available to the Court as part of this and related proceedings. This “transactions database” contains over 470 million purchases of e-book titles from 2008 through approximately the first quarter of 2012, spanning the aforementioned range of topics, genres, and interests.
 31. Economics teaches that the very marked diversity that makes up the book publishing and marketing industry would be expected to manifest in variations in demand that will, in turn, affect the dynamics of book pricing. As shown below, this is borne out by the dispersion and “churning” (i.e., prices moving up and down both absolutely and relatively) that we see in the data on book prices.
 32. From an economic perspective, the writing and publication of a commercially viable book entails a process of designing and tailoring a product to the interests and variegated willingnesses to pay of a highly diverse set of consumers. This includes variations in the timing and marketing of efforts associated with the release of different versions of the “same” title, e.g., hardcover, trade paperback, mass market paperback, e-book, enhanced e-book, audio book. The highly differentiated products that emerge from this process – covering the range of genres, writing styles, volume length, visual presentation, delivery medium, and, as I discuss at length below, *retail pricing* – reflect the extreme diversity of consumer preferences within the marketplace for “books.”

33. These facts demonstrate an important economic attribute of titles: They are not homogeneous, i.e., a title written by one author is not a perfect substitute for a title written by another author, or even another title written by the same author. The differences across titles result directly from the choices and investments made by the author and are driven by differences in author preferences, as well as differences in the costs and rewards authors face in their choices. The decisions made by authors vary greatly, as do the titles they write, and these differences are reflected in the different prices that titles can command in the marketplace both at any given time and across time.

C. Publishers

34. The database of book purchase transaction in this case identifies more than 100,000 publishers. Even recognizing that many of the identified publishers may be affiliates operating under some common corporate structure, the extensive number of publishing entities evidences the immense array of publishing options available to authors, the diversity of consumer preferences, and the degree of competition in the marketplace for publishing services. What is customarily recognized as a “publisher” ranges from relatively large, well known publishing houses, to smaller independents, to those specializing in providing titles that meet particular consumers’ preferences. To offer but four examples:

- a) Penguin Group (USA) is one of the leading trade book publishers in the United States. It has published over 4,000 fiction and nonfiction titles in print, electronic, and audio formats; subjects span literature, biography, memoir, history, science, business, psychology, popular reference, poetry, and self-help. In 2012, it had 255 New York Times (“NYT”) bestsellers. Its trademarks and imprints include Berkley Books, Dutton, Frederick Warne, G.P. Putnam’s Sons, Grosset & Dunlap, New American Library, Penguin Books, Philomel, Plume, Puffin, Riverhead Books, and Viking, among others.³⁰
- b) Random House is the world’s largest English-language general trade book publisher. It prints approximately 10,000 titles in various print, electronic, and audio formats. It states that it is home to 50 Nobel Prize Laureates and over 100 Pulitzer winners. Amongst the genres and subjects published by Random House are thriller fiction, fantasy, erotica, romance, horror, science fiction, antiques and collectibles, biographies, drama, cooking, home and garden, philosophy, and social

³⁰ www.us.penguin.com/static/pages/aboutus/index.html; and www.pearson.com/news/2013/february/pearson-2012-results.html

- science. Imprints include Ballantine Books, Bantam, Delacorte, Dell, Del Ray, The Dial Press, The Modern Library, One World, Presidio Press, Random House Trade Group, Random House Trade Paperbacks, Triumph Books, Spectra, Spiegel, and Grau and Villard Books.³¹
- c) The independent publisher Chronicle Books, founded in 1967, describes itself as “specializ[ing] in award-winning, innovative books for adults and children. [It’s] titles include best-selling cookbooks; craft books; fine art, design, photography, and architecture; lifestyle and pop culture; humor; literature; travel; games; and gift and stationery items. [It’s] children’s titles include activity books; art books; board books; picture books; chapter books; young adult; games; and gift and stationery items.”³² It has had a total of 23 bestsellers to date.³³
 - d) Harlequin, a well-known trade publisher, identifies itself as “one of the world’s leading publishers of books for women....publish[ing] more than 110 titles a month in 34 languages in 110 international markets on six continents. These books are written by over 1,300 talented authors worldwide, offering women a broad range of reading from bestseller fiction to romance, from young adult novels to nonfiction, from African-American novels to inspirational romance, and more.”³⁴ In 2012, 92 Harlequin titles spent a total of 313 weeks on the New York Times bestseller lists with four titles reaching number one.³⁵
35. More and more authors are publishing their titles themselves, i.e., they *self*-publish and thereby take on the role of the publisher. Historically, self-publishing accounted for a very small percentage of published titles because of the high costs associated with printing and distributing a printed title. However, self-publishing in electronic format is less costly and, with the emergence of e-bookstores, has seen continued expansion over the time period relevant to this proceeding.³⁶
36. Figure 2 shows the increase in self-published books as a percentage of total e-books sold by Amazon, Apple, and Barnes & Noble. In particular, the figure

³¹ <http://www.randomhouse.biz/about/factsandfigures/>

³² <http://www.chroniclebooks.com/our-company/faq>, October 29, 2013.

³³ <http://www.chroniclebooks.com/our-company/mission-statement>, October 29, 2013.

³⁴ <http://www.harlequin.com/articlepage.html?articleId=36&chapter=0>, October 30, 2013.

³⁵ <http://www.harlequin.com/articlepage.html?articleId=36&chapter=0>, October 30, 2013.

³⁶ See, for example, Library and Book Trade Almanac: 2010, 55th Edition 55, Information Today, Inc. (“2010 Book Trade Almanac”) at 451.

shows the growth in sales of self-published titles upon Apple's launch of the iBookstore, in April 2010 to approximately by March 2012.

- a) In January 2010, concomitant with Apple's looming entry with its own e-bookstore, Amazon announced a doubling of its commission rates for self-published titles, increasing what it paid to authors from 35% on any title to 70% (less a delivery fee), for sales in the United States on titles for which the author would agree to price the e-book between \$2.99 and \$9.99.³⁷ The 70% royalty rate matched Apple's well-known 70-30 split between content owner and agent. The new Amazon commission rates became effective, June 30, 2010. As shown by the figure, self-published titles' percentage of Amazon's total e-book sales represented [REDACTED] at the time of Amazon's announcement, but increased to [REDACTED] within 9 months of the new 70% royalty rate taking effect in the summer of 2010.
- b) Similarly, Apple's sales of self-published e-books increased fourfold from approximately [REDACTED] of Apple's total e-book sales at the time of the launch of the iBookstore to approximately [REDACTED] by March 2011 and to [REDACTED] by the end of March 2012. Barnes & Noble responded to the increasing competition for self-publishers by offering a 65% royalty on e-books priced from \$2.99 to \$9.99, while e-books under \$2.99 and over \$9.99 received a 40 percent royalty.³⁸

37. The increase in publishing-related services and by more publishing-related companies has served to increase the options for authors who choose to self-publish. Services range from the converting of a manuscript into electronic formats consistent with online retailing websites; preparation, editing, and visual presentation; facilitating the assignment of an International Standard Book Number ("ISBN"); and distribution support.

38. Entities which offer some or all of these services to authors include: Lulu Enterprises, started in 2002 as one of the first online self-publishing

³⁷ Amazon Press Release, "Amazon Announces New 70 Percent Royalty Option for Kindle Digital Text Platform, Enabling Authors and Publishers to Earn More Royalties from Every Kindle Books Sold", Businesswire, Jan 20, 2010. For e-books above or below that price range, Amazon's royalty rate for self-published titles remained at 35% of a title's price [REDACTED]

³⁸ Milliot, Jim, "B&N's PubIt Newest Self-Publishing Entrant", *Publishers Weekly*, October 11, 2010.

companies;³⁹ Smashwords, founded in 2008, allowing authors to publish and distribute through its own site as well as other retailers;⁴⁰ AuthorSolutions, one of the largest such services and, as noted below, recently purchased by the parent corporation of Penguin;⁴¹ Barnes & Noble's self-publishing platform PubIt!;⁴² Apple's iBooks Author publishing tool;⁴³ Amazon's Kindle Direct Program;⁴⁴ Bookbaby, the sister company of an online, independent music distributor;⁴⁵ Kobo online e-book retailer's Writing Life;⁴⁶ FastPencil, an e-book publishing service with social networking features;⁴⁷ and Scribd, which describes itself as the world's largest digital library.⁴⁸

39. The increase in demand for e-books, declining barriers to publishing by, for example, self-publishers, and greater incentives on the part of authors (as a consequence, in part, of Apple's launch of the iBookstore) has shifted the underlying economic structure of the publisher-author relationship. Rates of compensation, for example, have diversified away from more standard structures, depending on format, title, author, and publishing channel. In contrast to the more customary 25% royalty paid on digital editions of titles by the established publishing houses,⁴⁹ self-publishing services offer authors nearly three times those rates. Lulu, for example, offers self-publishing authors an effective 90% (gross) royalty rate by retaining 10% of the revenue from each sale by Lulu of a self-published title.⁵⁰ Smashwords pays authors 85% of the sales price for e-books on its own site and approximately 85% of its receipts for sales made through third-party retailers, i.e., net of such

³⁹ Hageman, Peggy "Self-Publishing Platforms: Getting Your Book Into the Marketplace," *EContent*, October 2012.

⁴⁰ <https://www.smashwords.com/about>

⁴¹ Greco, *et al.* at 188.

⁴² <http://www.engadget.com/2013/04/09/barnes-and-noble-relabels-pubit-as-nook-press/>

⁴³ <http://www.apple.com/ibooks-author/>

⁴⁴ <https://kdp.amazon.com/self-publishing/signin>

⁴⁵ <http://www.bookbaby.com/about>

⁴⁶ <http://www.kobo.com/writinglife>

⁴⁷ Fowler, Geoffrey and Jeffrey Trachtenberg, "Vanity Press Goes Digital," *WSJ Online*, June 3, 2010 ("Fowler and Trachtenberg") (www.online.wsj.com/article/SB10001424052748704912004575253132121412028.html).

⁴⁸ <http://www.scribd.com/about>

⁴⁹ 2010 Book Trade Almanac at 449; PX-0465 (RH-USDOJ-00001427 – 01483 at 01444); and Shatzkin, Mike, The other comparison: ebook royalties versus ebook self-publishing, August 30, 2010.

⁵⁰ <http://connect.lulu.com/t5/Lulu-Announcements/Earn-more-on-eBooks-90-Revenue/td-p/154959>

retailers' commission or fees (resulting in effective royalty rates on such sales of approximately 60%).⁵¹ The result, as shown on Figure 2, has been a dramatic increase in the share of self-published titles being purchased by consumers.

D. Retailers and Distributors

40. Titles are typically sold to consumers through retailers. Traditionally, titles were sold in printed format through brick-and-mortar stores, including large chains like Barnes & Noble and Borders, as well as independently-owned bookstores. The traditional model began to change with the advance of online retailing of print books, as "e-retailers", such as Amazon, took business from traditional brick-and-mortar stores.
41. The subsequent response of large bookstore chains and other "big box" stores, such as Walmart, into "e-retailing" operations served to further erode the traditional model of the book distribution marketplace. The impact of these changes are evidenced by a respected industry observer's assessment that a print book "price war" broke out between Amazon and Walmart, two non-traditional bookstores, in the fall of 2009 as each "sought to be the lowest-price source for books on [sic] bought online" by pricing certain new titles for less than \$9 (assessed to be at below wholesale cost).⁵²
42. Recent advances in digital "e-reading" technology, as discussed further below, have served to further transform the competitive landscape encompassing the sale and distribution of books.⁵³ Improvements in this technology have served to increase the demand for titles in electronic format through on-line bookstores and other distributors (i.e., "e-bookstores"). Some of these e-bookstores are the on-line presence of traditional brick-and-mortar stores, such as BN.com (i.e., Barnes & Noble's website) and booksamillion.com (i.e., Books a Million's website). Other e-bookstores, such as Amazon, Apple's iBookstore, Kobo, eBooks.com, and Sony Reader Store, are e-tailers that have no brick-and-mortar store equivalent. Still others are digital self-publishing service providers of the type noted above, including Smashwords, Lulu, and FastPencil. These providers have integrated into the retailing segment of the industry.⁵⁴

⁵¹ Shatzkin, Mike, "The other comparison: ebook royalties versus ebook self-publishing," August 30, 2010; and Fowler and Trachtenberg.

⁵² 2010 Book Trade Almanac at 450.

⁵³ Greco, *et al.* at 57.

⁵⁴ Fowler and Trachtenberg.

43. Prior to 2010, the major publishers and retailers in the United States operated predominantly on the so-called “wholesale” business model for marketing books. Under the wholesale model, the retailer pays the publisher a wholesale price set by the publisher for each copy of the title it sells to customers at a retail price set by the retailer. The retailer is then responsible for establishing the price or prices at which consumers will purchase any given title.
- a) As of early 2010, Amazon sold – and hence established the prices for – approximately 90% of e-books being sold in the U.S.⁵⁵ According to the testimony of Amazon executives, Amazon “invested substantial time and money in developing a system for setting the retail price of eBooks.”⁵⁶ That system, which involves highly confidential computer algorithms, was the subject of discovery requests that I understand were not allowed during the discovery phase of the litigation.⁵⁷ Absent detailed knowledge of the operation of Amazon’s pricing system, a reliable understanding of the economics underlying Amazon’s pricing of e-book titles during the pre-agency period, i.e., the time over which Amazon’s practices dominated the retail pricing of e-books, is not realistically possible.⁵⁸
 - b) Amazon’s transaction prices obviously reflect Amazon-specific decisions and response to marketplace forces that a model employing only generalized supply and demand factors (e.g., overall durable goods consumer spending and gross criteria of categorization, such as fiction or non-fiction, New York Times bestseller status, and format of the corresponding print title) would be inherently unlikely to capture the pathways – e.g., through Amazon – that market forces take and the outcomes they generate.
44. In early 2010, the major publishers and retailers began moving to the “agency” business model. The agency model of marketing introduced a dramatically changed competitive dynamic relative to the pre-agency setting. Under the agency model, the publisher establishes the retail prices of that publisher’s titles. The retailer (say, Amazon or Apple), meanwhile, acts as a sales agent for the publisher and is compensated for this function by collecting

⁵⁵ Transaction Database.

⁵⁶ Declaration of John Lange in Support of Motion to Quash or Modify Subpoena Duces Tecum, October 5, 2012.

⁵⁷ Transcript of Hearing, October 9, 2012 (granting Amazon’s motion to quash).

⁵⁸ [REDACTED]

a commission on each copy of a title sold to customers through its stores. Thus, the move to agency in 2010 meant that the competitive dynamic was shifted from one in which retail price determination was overwhelmingly the purview of Amazon as a retailer to one in which five major publishers (the Publisher Defendants) and independent publishers, eventually joined by a sixth (Random House), entered the marketplace as parties establishing retail pricing.

45. The advent of agency beginning in April 2010 also changed the competitive dynamic of publisher (and even certain author) compensation. Under the wholesale model, publishers sold their books to retailers (such as Amazon and Barnes & Noble) and received the wholesale prices that the publishers set for those books. Under the agency model, compensation to publishers has shifted to a royalty-type system.

- a) Specifically, under agency, the effective royalty or net proceeds on the sale of a given e-book that is paid to the title's publisher (be it a major publisher or a self-publishing author) has ranged from 35% to 85% of the retail price, depending on the platform through which it is sold. The remainder of the retail price is retained by the retailer as a form of commission for having marketed the publisher's product.
- b) Smashwords pays self-publishing authors 85% of the sales price for e-books sold on its own site and 85% of the net receipts for sales made through third-party retailers. Barnes & Noble offered a 65% royalty on e-books priced from \$2.99 to \$9.99, while e-books under \$2.99 and over \$9.99 received a 40% royalty.⁵⁹ Apple pays self- and traditional publishers 70% of a title's retail transaction price.⁶⁰ And, as noted above, Amazon altered its commission rates for self-published titles in response to Apple's looming entry, increasing what it paid to authors from 35% on any title to 70% for sales in the United States on titles for which the author would agree to price the e-book between \$2.99 and \$9.99.

46. An important question for industry participants has been the extent to which e-book sales either simply supplant purchases of print books or, instead, reflect additional purchases of titles that would not have been made but for the title

⁵⁹ Milliot, Jim, "B&N's PubIt Newest Self-Publishing Entrant," *Publishers Weekly*, October 11, 2010.

⁶⁰ The noted rates do not include sales or other taxes or other transaction-related fees that may be deducted from the transaction price. Shatzkin, Mike, "The other comparison: ebook royalties versus ebook self-publishing", August 30, 2010; Vook, *Ebook Marketplace and Royalties: Everything authors need to know*, at 7.

being produced in digital format. Here the evidence indicates that each effect is present to a substantial degree. Survey data find that switching away from print books is occurring as certain consumers opt for e-book versions of the titles they are attracted to and thus forgo the purchase of the print versions of the titles they would otherwise buy.

- a) For example, more than half of the respondents to BISG's February 2012 survey on attitudes toward e-book reading noted that they were decreasing expenditures on hardcover and paperback print books, while over 75% were increasing their expenditures on e-books.⁶¹ Academic research estimates that approximately two-thirds of all e-book purchases come at the expense of the print version, while one-third of e-book sales come from consumers who would not have otherwise purchased the title.⁶²
 - b) Not surprisingly in light of such cross-effects between e-book sales and print book sales, traditional print publishers have faced economic tradeoffs between their e-book offerings and e-book pricing and their print book offering and print book pricing. All else equal, lower e-book pricing might be expected to increase e-book sales, but in so doing, print book sales of the same title or of close substitutes to the subject e-books would be expected to decline and associated optimal print book prices could be reduced.
47. For a consumer to read an e-book that he or she has purchased, the consumer must have a reading device—what economists refer to as a *complementary* product. A reading device can be a mobile device dedicated to rendering an e-book title, a tablet computer, a laptop or desktop computer, or even a smart phone.
- a) Some retailers such as Amazon and Apple offer their own reading devices. These can be either dedicated reading devices (i.e., “e-readers”) or tablet computers (such as Apple's iPad or Amazon's Kindle Fire). Other retailers (such as the self-publishing service providers noted above) simply sell e-books without offering their own e-reading devices.
 - b) These differences have significant economic implications for the matter at hand, as they reflect the heterogeneity of the marketplace and

⁶¹ MCMLN-LIT-00321802-1847 at 820

⁶² Li, Hui, “The Impact of Ebooks on Print Book Sales: Cannibalization and Market Expansion,” 2013 manuscript.

introduce important scope for consumer brand loyalty (such as the well-known loyalty of certain consumers to Apple products⁶³). As I discuss below, whether or not a particular consumer was injured by the conduct that the Court has found to be unlawful can depend on such individualized matters as where, when, and whether to purchase to an e-book title.

48. Over the time period relevant to this proceeding, there are a number of e-reading devices (beyond desktop and laptop computers) that entered the marketplace. Figure 3 shows e-readers and tablets that were introduced or were otherwise available to consumers in 2008, 2009, and 2010 and whether they were associated with a specific e-retailer. The figure lists 23 different devices by 13 different manufacturers. Three devices were not associated with a particular e-book store.
49. Not all devices have the same capabilities. Tablets, for example, have a broad range of functions and applications beyond e-reading, including e-mail, word processing, full access to the internet, and installation of user-specific applications. A dedicated e-reader, in contrast, has a much more limited range of uses beyond the e-reading application within its operating system. Moreover, a dedicated e-reader is typically limited to the purchase of e-books from a particular retailer, whereas a tablet offers the user the ability to choose e-book vendors not directly associated with the device's manufacture.
50. E-reading technology has been advancing rapidly. Figure 4 shows enhancements of e-reading technology since the introduction of the first widely-accepted dedicated e-reader – the SONY PRS-500 – in 2006. Many of these improvements have been continuous and/or have come since the advent of agency marketing in 2010. From longer battery life and lower weight (which enhance a device's portability) to advances such as cellular connectivity and video integration, these improvements have served to increase the functionality of e-reading devices and enhance the experience of the user. In so doing, because e-reading devices are complements to e-books, these improvements have increased the demand for e-books. As noted above, however, not all improvements are common to all devices. There exists a range of features by device available to the e-book buying consumer. The choice of any given e-reading device will be driven, in part, by consumers' preferences regarding device attributes and, of course, price.

⁶³ Rogowsky, Mark, "If You Think Apple Customers Are Loyal Now, Watch and See What's In Store," *Forbes*, July 7, 2013, <http://www.forbes.com/sites/markrogowsky/2013/07/07/if-you-think-apple-customers-are-loyal-now-watch-and-see-whats-in-store/>, accessed November 4, 2013.

51. Figure 5 tracks the prices of selected e-readers and tablets between January 2008 and November 2012. Specifically, it maps the prices for different versions of Amazon's Kindle and Barnes & Nobles' Nook e-readers and tablets, as well as for Apple's very popular iPad tablet. Reflecting the commonly observed phenomenon of price reductions as high-tech products mature, as well as the impact of the introduction of new competitors (such as Apple's iPad in 2010), the price of e-reading devices has declined throughout the relevant time period in this matter.

- a) The downward trend in prices of e-readers speaks directly to the economics of complementary products. Given that consumers' decisions as to whether to begin purchasing e-books would reasonably take into consideration the cost of the necessary reading device, i.e., the consumer would reasonably consider the total cost of reading e-books.⁶⁴ A fall in e-reader prices would spur e-book demand.
- b) On the flip side of the same coin, an exogenously-caused rise in e-book prices (such as Plaintiffs assert was brought on by the unlawful conduct of Defendants in this case) would reduce the demand for e-book readers and thereby put e-reader prices under downward pressure. In the case of entities that produce both goods, this downward pressure on e-reader prices would dissipate additional revenues earned from the sale of e-books sold at putatively higher prices. This would inure to the benefit of consumers acquiring new e-book readers or desiring to switch or upgrade their e-reading devices, and would act directly to offset in whole or in part any injury to such consumers from an exogenous rise in the prices of e-book titles. I discuss the implications of these economics for class certification below in Section IV below.

E. Consumers

52. Researchers who have studied the publishing sector and what makes one book a big "hit" while another book fails to catch on with the consuming public liken book buying consumers to gas molecules: "At some point in time, and no one knows when, and at some location, and no one knows where, the molecules cluster. A clustering process takes place among readers, and groups of people who will buy the same book, but no one knows for sure when and why this occurs. It just happens because of the impact of the information cascade, fashion, style, trends, taste, etc. In essence, authors, booksellers, editors, and marketers do not know with any precision how this

⁶⁴ This is acknowledged by Plaintiffs' expert, Prof. Noll. See Deposition of Roger G. Noll, November 1, 2013 ("Noll Deposition") at 40:3 to 41:11.

process works (and of course consumer research is exceptionally rare in book publishing)... The end result is that a small number of books (perhaps 20%) dominate sales (accounting for perhaps 80% of all sales)".⁶⁵

53. This analogy, and its conclusion, is illustrated in Figure 6, which asks what fraction of titles constitutes 80% of all e-book sales. It answers this question by ranking titles by sales quantity for 2009 e-book sales. As shown, the e-book marketplace is more "clustered" than the analogy to gas molecules suggests. Just 4% of all titles account for 80% of all e-book sales, leaving over 95% of published titles making up only 20% of total e-book sales.
 - a) The "popular sellers" that make up the 4% of e-books that account for 80% of all e-book sales, sell on average over 2,200 units, with a weighted average price of \$5.39 per title. The "non-popular sellers", i.e., the 96% of titles comprising just 20% of sales typically sell approximately 25 units, with a weighted average price of \$7.91 per title.⁶⁶
 - b) These economics mean that the processes of a book catching on with the public and consumers coming to cluster around particular titles to varying degrees over time would be expected, all else equal, to generate different supply and demand trajectories over time for books of different popularity. Thus, as I discuss further below, a proper model of impact and damage would need to account for evolving relative demands across books in order to explain the prices of the specific title or titles that any individual consumer has purchased. Prof. Noll's model does not do this.
54. Consumer surveys find that there are a multitude of factors that may induce a given consumer to purchase e-books.⁶⁷ These include such factors as: Familiarity with the author; the consumer's interest in particular subject matter or subgenres, the consumer's consideration of whether the title has been deemed noteworthy through a bestseller list or national book club, a favorable book review, or a recommendation from a friend, price, and even the consumer's response to visual layout or cover art. The fact remains, however,

⁶⁵ Greco, *et al.* at 4.

⁶⁶ This excludes free e-books titles.

⁶⁷ See, for example, BISG, *Consumer Attitudes Toward E-Book Reading*, Volume 2, Report 2, April 2011, at 15, 17.

that very little is known as to systematic, common factors that might explain the supply *and* demand and, hence, pricing of individual e-books.⁶⁸

55. This problem is further compounded by the relatively recent adoption of e-books by the general public. As noted above, as recently as 2010, sales of e-books represented only on the order of 4% of overall book sales. Industry trade research refers to the consumers who underlie this figure as “early adopters”,⁶⁹ reflecting the characteristics of individuals willing to incur the relatively high costs and uncertainty associated with the learning and adoption of new technologies. With the improvement of technology and the lowering of device prices, the demographics of e-book buyers have changed over the relevant time period with readers becoming more regular acquirers of e-books and shifting away from exclusively acquiring only free e-books.⁷⁰
56. As the e-book marketplace grows through the advances in e-reader devices, expansions in e-book content, improvements in the display of information contained in e-books, and growing consumer familiarity with e-reading, it would be reasonably expected that actual and potential e-book consumers would begin to mirror characteristics and preferences of the larger population.
 - a) Indeed, in the case of Apple, the notable brand loyalty of many of its customers is being reflected in e-reader and e-book sales. With “early adopters” reasonably expected to consist of relatively “tech savvy” consumers, and with e-readers like the Kindle coming out before the iPad, it is perhaps not surprising that at the beginning of 2011 surveys found that approximately 40% of iPad owners also owned a Kindle, with that figure being reported at approximately 33% in early 2012.⁷¹
 - b) Figure 7 breaks out Apple iBook sales by customers who only have the Apple iBookstore reading “app” (application) on their iPad and other Apple devices and those who have downloaded competitors’ e-reading “apps” (presumably to be able to use their iPads or other Apple devices to purchase e-books from other than Apple’s iBookstore). The figure shows that approximately [REDACTED] of e-books purchased from the iBookstore were sold to individuals with only the iBookstore as a chosen source of e-books (e.g., did not have access to Amazon e-books through a Kindle application.)

⁶⁸ Greco, *et al.* at 4.

⁶⁹ PEN-LIT-00000064-0102, at 90.

⁷⁰ BISG, *Consumer Attitudes Toward E-Book Reading*, Volume 2, Report 2, April 2011, at 7, 11.

⁷¹ BISG, *Consumer Attitudes Toward E-Book Reading*, Volume 3, Report 2, April 2012, at 11-12.

- c) Finally, as evidence that we are still in the relatively early stages of the e-reading phenomenon, and that consumers are still moving toward establishing patterns of e-book use, Figure 8 indicates that over the class period of April 2010-April 2012, fully [REDACTED] of the millions of Apple's iBookstore customers purchased only one e-book from the iBookstore. Another [REDACTED] purchased no more than two e-books from the iBookstore.

F. E-Book Prices

57. Plaintiffs in this matter describe e-books as being subject to a retail pricing “structure,”⁷² and represent that structure was affected as a whole such that essentially all class members’ purchase prices of books were elevated and “what remains is a formulaic calculation of the damage to consumers Apple caused.”⁷³ According to Plaintiffs, the pre-agency “industry standard” was \$9.99 pricing employed by Amazon;⁷⁴ and the effect of the Defendants’ unlawful conduct was to “eradicate the Amazon \$9.99 price point... and raise consumer market prices”.⁷⁵
58. The discussion above of the economics of the publishing industry, however, describes a setting of highly differentiated products (i.e., books of numerous different genres written on innumerable topics by authors of widely differing talent and recognition) competing for the e-reading attention of heterogeneous consumers who vary widely in their tastes with respect to the topics, authors, mediums, styles, depth, purposes, and other attributes of what they purchase to read.⁷⁶ Indeed, it is this heterogeneity that produces the differentiation of products, with millions of book titles seeking to find reception in a highly uncertain and variegated consumer landscape. In short, so many different books are written and published for sale because there are so many different variations in preference among the consuming public.

⁷² See, for example, Amended Complaint at ¶101.

⁷³ Class Certification Motion at 3.

⁷⁴ Amended Complaint at ¶6 and 13.

⁷⁵ Class Certification Motion at 1.

⁷⁶ Prof. Noll recognizes the marked differentiation of products and heterogeneity of consumer class members. See Noll Deposition at 95:3-8 (“Obviously [the Publisher Defendants] don’t sell homogeneous products and it’s not perfectly competitive. Indeed, a publishing firm couldn’t be perfectly competitive because of the nature of cost function. But I’m assuming there is a blanket competition in among the publishers.”). However, as I discuss in Section V below, Prof. Noll’s damages modeling fails to adequately account for these central attributes of the e-book marketplace.

59. These economics would not be expected to produce a “price structure”, much less a stable “price structure”, to e-book pricing since, in addition to the array of non-price attributes that can make a book more or less attractive to a consumer, *price* is an element that matters to consumers when choosing what titles to purchase. Rather, the kind of product differentiation, buyer heterogeneity, and marketing uncertainty that characterize book selling would be expected to produce highly dispersed and unstable pricing. This is confirmed by examination of the extensive data on consumers’ actual book purchases that is available to us in this proceeding.
- a) First, Figure 9 shows the distribution of e-book sales volumes across the observed range of transaction prices prior to the onset of agency marketing. While many books sold at \$9.99, approximately 65% did not. Retail sales prices ranged widely above and below \$9.99.
 - b) In fact, actual e-book transaction prices have been widely dispersed both before and after agency. This is seen in Figures 10A through 10F, which show the retail prices of each Publisher Defendant’s and Random House’s (Figure 10F) top ten selling titles from the cohort of titles released in December 2009. The data extend from that e-book release date through the first quarter of 2012. The evident dispersion of prices is not unique to books released in December 2009; it is a defining characteristic of e-book pricing.⁷⁷ The dispersion of prices we see in these figures and elsewhere are the expected consequence of book sellers seeking to match their combined price-and-product offerings to consumers’ highly variegated preferences and willingnesses to pay (demands).
 - c) The evident dispersion we see across e-book titles arises even within a given title. This is illustrated in Figures 11A-C, which show the actual transaction prices of a relatively high-priced, medium-priced, and low-priced e-book, respectively, drawn from Plaintiffs’ expert’s highest damage “group” of titles, according to his damage calculations.⁷⁸ (See Figure 24 below.) Both before and after the onset of agency, the first title, *Atlas Shrugged* in Figure 11A, shows dispersion of prices even for a given retailer and an extremely wide dispersion of prices across retailers – with ranges of \$10 and more between the upper and lower levels of pricing. The medium-priced title, *A Thousand Splendid Suns*, in Figure 11B exhibits sustained dispersion of \$3-\$4 on a title tending

⁷⁷ See, for example, 18A-18K, discussed further below.

⁷⁸ This group is defined by Prof. Noll as consisting of Penguin-published fiction titles that have hardcover and paperback editions and that were released at least a year earlier. See Figure 24 below.

to sell in the \$9-\$14 range. In Figure 11C, the low-priced book, *Guilty Pleasures*, shows sustained dispersion of \$4-\$5 on a title that quite consistently sold in the range of \$4-\$10. Moreover, these three titles are only illustrative of dispersion; substantial price dispersion is ubiquitous across titles both before and after the onset of agency marketing.⁷⁹

60. Finally, e-book pricing is not only characterized by ubiquitous price dispersion; it is also subject to substantial *churning*. That is, e-book prices are commonly subject to more or less continuous and tumultuous changes in prices relative to one another, with title A's price going up at one moment while title B's price is going down, both then rising relative to some other title C's price, then the price of C and B rising as A's price is declining, and so on. This churning occurs both within and across individual retailers' pricing.

a) Figures 12A through 12F show the daily modal (most common) price of top 50 selling Amazon e-book titles broken out across Amazon's genre-like categories of literature and fiction, mystery and thrillers, nonfiction, romance, science fiction and fantasy, and teen, respectively. Figures 13A through 13F show similar analyses of Barnes & Noble's weekly modal prices for its top 50 selling literature and fiction, mystery and thriller, non-fiction, romance, science fiction and fantasy, teens.⁸⁰

b) The churning of e-book prices and absence of structure is evident in Figures 12A-F and 13A-F. Moreover, this churning prevails both prior to the onset of agency and the introduction of Apple's iBookstore and after that point; and the churning we see before and after the onset of agency marketing was generated by different processes. That is, as discussed above, the pre-agency period was dominated by the retail pricing strategies and decisions of Amazon as a non-publishing retailer. Following the onset of agency, pricing decisions and strategies were placed in the hands of multiple major publishers and growing numbers of self-publishers.

61. As I discuss below, dispersion and churning of the prices paid by the members of a proposed class (or by a group of consumers) means that those class members are in dispersed and churning positions relative to one another, telling us that, depending on when, what and from whom they buy, they have experienced *uncommon* economic outcomes in the marketplace. At the very

⁷⁹ See, for example, Figures 18A-18K, discussed further below.

⁸⁰ The available Barnes & Noble transaction data do not show individual transaction prices, but is aggregated to the weekly level.

least, the data here tell us that there is no standard, stable e-book “pricing structure” that might otherwise have held consumers in a stable relationship such that the unlawful conduct of Defendants could be treated as a rising tide that commonly lifted all boats.

IV. THE ECONOMICS OF THE UNLAWFUL CONDUCT: IS COMMON ADVERSE IMPACT PLAUSIBLE?

A. E-Book Price Dispersion and Churning: Implications for Certification

62. In its monograph titled *Econometrics: Legal, Practical and Technical Issues*, the Antitrust Section of the American Bar Association (“ABA”) discusses the implications for class certification of the churning of prices that are dispersed across the various purchasers of a product: “Generally, when the prices for some customers are going up while the prices of other customers are not, there is reason to doubt that the different customers (class members) are experiencing a common impact.”⁸¹
63. Here the churning of prices across class members that is described by the ABA tells us that *something* substantial driving prices is not common across customers of the defendants’ products. Is the dispersion and churning the result of normal or otherwise legitimate supply and demand forces that are individualized to particular purchases because, for example, normal supply and demand conditions vary across the transactions and/or specific products that the unlawful conduct is said to encompass? Or does the impact of the unlawful conduct at issue vary across the transactions and/or products at issue because the nature of that conduct is actually not uniformly effective or harmful to all members of a proposed class?
64. Such questions must be answered empirically since, after all, it would be assuming what needs to be proved to simply presume or assert that the alleged unlawful conduct is uniformly harmful to class member customers, and that any observed dispersion and churning of prices is just so much normal “foam” on the top of the proverbial rising tide. The challenge empirically is to isolate reliably movements in individual class members’ specific purchase prices that are, in fact, causally attributable to the unlawful, anticompetitive conduct of defendants from the movements in those prices that are caused by normal or otherwise legitimate class member-specific factors. This is not necessarily an impossible task. As the ABA notes in the monograph cited above, *if* dispersion and churning “are due to measurable and systematic factors that

⁸¹ ABA Section of Antitrust Law (2005) at 210.

can be controlled for in a [statistical] regression, a common impact may be shown and class treatment may still be appropriate.”⁸²

65. In statistical regression analyses, including the type proffered on behalf of Plaintiffs by Prof. Noll in this proceeding, *controlling for* “measurable and systematic factors” means accounting for (or economics says “explaining”) the normal or otherwise legitimate movements in observed prices so as to effectively remove the churning and leave common movements in prices that can be tested for effects of the unlawful conduct. This is not necessarily an impossible task, but it can be impossible using “common facts” as data inputs into a regression analysis – data that the ABA refers to as “measurable and systematic” factors – since, as noted, the very existence of dispersed and churning prices tells us that economic forces, lawful and/or perhaps unlawful, are operating differentially on the prices that individual consumers pay. Thus, properly accounting and controlling for purchase-specific normal and legitimate factors that explain dispersion and churning of prices can readily require specific inquiry into and data collection on the individualized economic facts and circumstances that affect class member-specific transaction prices. Yet, such inquiry and data collection is the kind of exercise that class certification presumes is unnecessary.
66. As I discuss at length in Section V below, Prof. Noll has not undertaken the inquiry and data collection that would be required to control for normal and legitimate dispersion and churning of the actual prices that consumers have paid for e-books in the claimed damages period. Instead, he has imposed by mathematical assumption the requirement that his modeling and damages calculations find “common impact.” This is the result of his analysis employing a “reduced-form pricing equation” that assumes that the average impact is the same as the individual impact. This is the methodological fallacy of “assuming what one is trying to prove.” Be that as it may, as I show in Section V below, Prof. Noll’s actual results show that even after accounting for all of the measurable and systematic variables he found pertinent to put in his regression model of e-book prices, churning of class members’ transaction prices is pervasive. His damages model cannot be said to have isolated the fact and magnitude of injury caused by the unlawful conduct of Defendants.
67. An examination of the dispersion and churning in consumers’ e-book transaction prices indicates that the impacts of the unlawful conduct would not be expected to yield either a common fact or a common magnitude of injury. These data are describing extensive churning and instability in e-book pricing.

⁸² ABA Section of Antitrust Law (2005) at 210-211.

B. Quantifying the Extent of Differential Price Movements across Consumer Purchases

68. The analysis below reveals the demonstrable presence of pervasive price dispersion and churning of e-book retail prices both before and after the switch to agency. Prices for e-books do not change uniformly, in either magnitude or direction, even accounting for release date. Such differential price movements stand at odds with the assumption that different customers have experienced a common impact. They tell us that individual e-book titles are subject to title-specific supply and demand forces both with and without agency marketing. In doing so, they confound our ability to employ “measurable and systematic factors” on a common basis that account for changes in individual titles’ prices so as to allow us to reliably isolate and quantify the common effects, if any, of unlawful conduct from the effects of normal supply and demand factors that cause prices to change.
69. Figures 14A and 14B address the question of whether the prices of e-book titles are moving in the same direction at any given point in time. Figure 14A displays the percent of titles experiencing a change in their daily modal price, be it an increase (the green line) or a decrease (the red line). On any given day, approximately 1 to 5 percent of titles change price. Over the January 2009 – April 2012 period, approximately 400 to 650 Publisher Defendant and Random House titles sold through different retailers saw their prices move on a daily basis. Approximately half of these changes are increases, and approximately half are reductions. The data do show “spikes” in titles both increasing and decreasing at or about the beginning of April 2010, upon the launch of the iBookstore. These spikes are modest, however, with almost 90% of e-book titles’ prices not changing at that time.
 - a) Figure 14B displays similar information, but using a weekly modal price. Here, too, we see e-book titles’ prices commonly moving both up and down at any given time, and we see modest up and down spikes in early April 2010.
 - b) As I discuss further below, the downward spikes of the type seen in Figure 14A and 14B are consistent with an expectation from economics that, contrary to Plaintiffs’ claims, publishers would adjust their prices both up *and* down across their tens of thousands of offerings upon implementation of agency marketing even when, on average across titles, publishers might seek higher prices.
70. Figures 15A and 15B focus on the commonality or disparity of price movements among only those e-book titles that experienced price changes at any given time. Figure 15A considers titles that realized a change in their daily modal price and asks to what extent those price changes moved in the

same direction. A result of 100% would indicate that all price changes which occurred were in the same direction. A result of 50% would indicate that half the price changes increased and half decreased. At no point in time does the blue line reach 100%, i.e., at no point do all price changes move in the same direction, most commonly residing approximately between 55% and 65%; i.e., approximately 60% of price movements in one direction and 40% in the opposite direction. Using weekly modal prices, Figure 15B addresses the same issues and yields the same basic information as Figure 15A. The data demonstrate substantial churning of prices and tell us that there exists no uniformity of price movements before or after the onset of agency.

71. Figures 16A and 16B quantify the extent of churning in e-book prices both pre-agency (Figure 16A) and post-agency (Figure 16B). Recognizing that as e-books “age” in the sense that they get further out from their release dates over time, and that consumer interest is likely to peak and eventually wane, these figures show the correlations of price movements across e-books of the same age cohort (i.e., titles of the same age in that they share the same release week).
 - a) The bottom axes in Figures 16A and 16B measure the extent to which prices for a given title pair tend to move in the same direction. If two titles’ prices consistently move in the same direction, their correlation statistic approaches 1.0, perfect positive correlation. If two titles’ prices move in no discernible, regular pattern, they have no correlation and their correlation is 0.83. If two titles’ prices always move in opposite directions, they show negative correlation of -1.0. Even at a correlation of 1.0, prices may churn: That is, even though the two prices always move in the same direction, if they have different absolute levels, these movements can cause their relative positions to change.
 - b) Moreover, churning increases rapidly as correlations drop below 1.0. In business contexts, correlations of 0.5 are regarded as only moderate, as only 25% of the movement of one variable can be accounted for by the movement of a second variable. Correlations of “more than .80 are generally very strong and of great practical importance.”⁸⁴

⁸³ If two titles’ prices consistently move in the opposite direction such that when one goes up the other goes down, their correlation approaches -1.0. See figure notes.

⁸⁴ Friedman, Hershey, “Scatter Plots, Correlation, and Regression,” Brooklyn College, CUNY, accessed at *Learning Ace*, <http://www.learningace.com/doc/1433559/6171c0810625b65779dab98b0ac9086b/correlationregressionweb>, November 13, 2013, at 8-10.

72. The vertical axis in each figure measures the cumulative share of title pairs who have a correlation equal to or greater than the corresponding value on the bottom axis. Thus, for example, Figure 16A shows that less than 10% of the tens of thousands of correlations in the period prior to agency have statistically significant correlations above .80. In the post-agency damages period, the comparable test is passed by only about 10% of the pairwise price correlations. The data reveal extensive churning of prices. The “reason to doubt that the different customers (class members) are experiencing a common impact”⁸⁵ is pervasive in this case.
73. The foregoing behavior of individual e-book prices, as shown in Figures 9 through 16, tells us that individual titles are subject to supply, demand, and strategic business forces that result in quite material movements in prices even in the absence of the unlawful conduct. The data show that e-book titles churn in opposite directions even among titles of similar cohorts, in a substantial number of instances. Moreover, although the shift to agency would have been expected to quite abruptly alter the dynamics of those forces (as the marketplace went from Amazon-dominated retail pricing to publisher-driven retail pricing), there is no indication in the data that the unlawful conduct at issue somehow shut down the operation of not-common, title-specific supply, demand, and strategic business forces so as to end the churning of e-book prices.
74. Indeed, both pre-agency and post-agency, we readily observe the kinds of forces at issue. Some e-books have media tie-ins, such as movie releases, with the result that the supply and demand conditions around that title are different from other titles. Some e-books are better suited to being read on a tablet, such as an iPad as opposed to a dedicated e-reader, with the result that the supply and demand conditions around that title are different from the same title on a separate e-reader platform. Some titles catch on with certain class members who have particular willingnesses-to-pay and other titles do not. Amazon, as a retailer marketing and setting the prices of numerous publishers’ offerings and interested in its own business’ well-being, would not make the same strategic decisions as multiple publishers each marketing and setting retail prices for their respective separate title offerings. The result is that price dispersion and churning are demonstrably present before and after the switch to agency. Assumption of a common fact, much less assumption of a common magnitude, of injury is unjustified in this case.
75. The American Bar Association (“ABA”) has aptly described a variety of reasons why even a straightforward price-fixing conspiracy can have varying

⁸⁵ ABA Section of Antitrust Law (2005) at 210.

impacts on consumers: “A conspiracy may have little or no effect on some customers for many different reasons. For example, some purchasers may be in areas that have fewer suppliers, and because there are fewer suppliers, price may already be at the monopoly level as the result of tacit collusion. Explicit collusion would not raise price to such customers. Alternatively, some buyers may suffer less impact from a conspiracy because they have more options than other buyers do. Perhaps they have a greater ability to switch to substitute products or to bring the product in from areas unaffected by the collusion.”⁸⁶

76. The ABA’s observations as to differential impacts of antitrust conspiracies on consumers are particularly relevant here. At least four kinds of class members stand out as not being adversely impacted and, depending on specific class members’ facts and circumstances, either being unaffected or benefiting in demonstrable ways (potentially to the point of being better off on net) as a result of the move to agency marketing occasioned by the Defendants’ unlawful conduct.⁸⁷ These types of class members are: (1) e-book buyers who purchased e-book titles at prices which were unchanged or lower than their but-for levels as a result of the move to the agency; (2) e-book buyers who would not have purchased e-books absent the iBookstore; (3) e-book buyers who purchased self-published e-book titles that would not be available absent the unlawful conduct; and (4) e-book buyers who purchased an e-reader during the class period. Let us consider each of these in turn.

C. E-book Buyers Who Bought at Unchanged or Lower Prices as a Result of Agency

77. These types of consumers arise for at least two reasons. First, the agency agreements entered into by the Publisher Defendants contained specific contractual provisions that had the effect of capping and/or lowering the retail prices of certain titles. Second, even without such contractual provisions, the change in pricing dynamics from Amazon-dominated retail pricing to multiple publishers being primary decision makers over retail pricing demonstrably resulted in large numbers of titles’ prices declining as a result of the move to agency.

The Impact of Agency Agreements

78. Both Plaintiffs and their expert, Prof. Noll, assert that the move to agency marketing that began in April 2010 resulted in increases in the *average* prices

⁸⁶ ABA Section of Antitrust Law (2005) at 204.

⁸⁷ In addition, Prof. Noll’s analyses fail to account for the benefit of settlement payments to the extent they are collected by individual consumers.

of e-books.⁸⁸ As I discuss in detail in Section V below, the mathematics of Prof. Noll's damages methodology builds in – by assumption, rather than by empirical demonstration – the requirement that each and every purchase by a class member can *only* be found to have been subject to the average percentage overcharge he finds for the group to which he assigns a given title.

- a) These groupings are based on, for example, a title's publisher, time since a title's release, whether a title was a New York Times bestseller, and Prof. Noll's determination as to one of his broad genre categories of a title. These broad genres entail the aggregation of the hundreds of genres and sub-genres of e-books shown in Figure 1 into but four groups (Fiction, Nonfiction, Advice, and Teens' and Children's), plus "Other" and "Unidentified".⁸⁹ The titles in Prof. Noll's groupings number into the tens of thousands.
- b) The built-in mathematics of Prof. Noll's damages methodology can *only* find that every title within a grouping was subject to precisely the same overcharge from the very first day of a publisher's implementation of agency marketing through to the end of the damages period in 2012.

79. These latter assumptions of Prof. Noll's modeling are contradicted by the very publisher-retailer agreements that implemented agency marketing. The agreements struck between Apple and Publisher Defendants, for example, established maximum prices that could be established by a publisher on certain titles for defined periods of time. In particular, the agreements applied solely to newly released hardcovers, where "newly released" was defined for certain Publisher Defendants as seven months following the first publication, and for others as twelve months from first generally available commercial publication, where the hardcover title's list price lay within certain ranges.

- a) For example, the agreements with Hachette, Penguin, Macmillan, and Simon & Schuster were silent as to the pricing of e-books whose newly released hardcover versions had list prices at or less than \$20. Under the agreements, newly released hardcover books with list prices between \$20.01 and \$22 were to be priced at \$9.99. The agreement between HarperCollins and Apple, in contrast, established a maximum price of \$9.99 on newly released hardcover titles priced between \$0.01 and \$22.

⁸⁸ Amended Complaint at ¶¶20 and 180-181; Noll Declaration at 9 and 12.

⁸⁹ Noll Declaration at Exhibit 1.

- b) There is similar diversity for e-books whose corresponding newly released hardcover print format had list prices of more than \$40. The agreements with Penguin and Macmillan are left to the publisher's discretion as to the pricing of such e-books. The agreements between Hachette and HarperCollins permit the publisher to establish prices for such e-books so long as such prices are "realistic." Moreover, the agreement with Hachette provided the publisher with opportunity to offer prices differing from those set out in the pricing tiers. Specifically, the agreement permitted Hachette to explore limited pricing tests beginning three months from the launch of the Publisher's e-books on the online store.
 - c) Pricing terms in the agreements also provided for differential pricing if a title's newly hardcover version achieved New York Times bestseller status. In that case, the e-book price was not to be more than \$12.99 where the hardcover print version had a list price of \$30 or less. For such print books with a list price between \$30.01 and \$35, the price of the e-book was restricted no greater than \$14.99.
80. While Prof. Noll performs none of the individualized inquiry that would reveal it, the effect of the specific terms of the agency agreements on the prices of specific titles would be to have left their prices unchanged or to have pushed them down upon the onset of agency.
- a) Thus, for example, the price of the e-book title *True Compass: A Memoir*, the posthumous memoir by former Senator Edward M. Kennedy, decreased under agency from its pre-agency, wholesale marketing price of \$19.25 in March 2010 to a post-agency price of \$16.99. (See, Figure 10A, above.) Published by Twelve, a division of Hachette, the hardcover print format was released mid-September 2009 with a list price of \$35.⁹⁰
 - b) *True Compass* debuted at number one on the New York Times bestseller list.⁹¹ Under Hachette's agency agreement with Apple, a Hachette e-book title with a corresponding print book within seven months of release and which had a list price between \$30.01 and \$35 would have a maximum e-book retail price of \$16.99. That we find the price of the e-book *True Compass* declining from \$19.25 to \$16.99 immediately upon the onset of agency at Hachette confirms the price-reducing effects of the unlawful conduct on the price of the title and

⁹⁰ See workpapers.

⁹¹ "Hardcover Nonfiction – List". *The New York Times*. October 4, 2009.

exemplifies the individualized inquiry required to reveal the effect of the specific terms of the agency agreements on the prices of specific titles.

- c) A similar case is seen with *The 13th Hour*, a contemporary crime thriller, by Richard Doetsch. Published on December 29, 2009 by Simon & Schuster with a list price of \$25.99, the price of the title's e-book decreased under agency from its pre-agency wholesale marketing price of \$14.29 to a post-agency price of \$12.99 in April 2010.⁹² Under Simon & Schuster's agency agreement with Apple, an e-book associated with a new release, hardcover print book, which is not a New York Times Bestseller and which has a list price between \$25.01 and \$27.50, would have a maximum e-book retail price of \$12.99. The fact that upon the onset of agency on April 3, 2010 we found an immediate decline in price of the e-book from \$14.29 to \$12.99 confirms the price-reducing effects and further solidifies the need for individualized inquiry required to reveal the effects of the specific terms of the agency agreements on prices of certain titles.
- d) *Hazard*, a fictional story set in rural Appalachia, offers yet another example. This book, authored by Gardiner Harris and published by Macmillan on March 16, 2010 with a list price of \$25.99, also saw a decline in the price of the title's e-book upon the onset of agency, with the price declining from \$14.29 to \$12.99.⁹³ This decline in price mirrors the terms of the agency agreement between Macmillan and Apple. Per the terms of the agreement, an e-book title with a corresponding hardcover print book that is not a New York Times Bestseller, within seven months of its release having a list price between \$25.01 and \$27.50 would be priced at a maximum of \$12.99.
- e) Yet another book by Macmillan, called the *Perfect Peace* by Daniel Black, with the same characteristics as *Hazard* and published on March 16, 2010 also realized a decline in the e-book version of the title from \$14.29 to \$12.99 upon the move to agency.⁹⁴ The decline in price was consistent with the terms of the agency agreement between Macmillan and Apple.

⁹² Based on daily modal prices. See workpapers.

⁹³ Based on daily modal prices. See workpapers.

⁹⁴ Based on daily modal prices. See workpapers.

- f) We see similar patterns of post-agency price declines in Plaintiffs' e-book purchases. Discovery produced in this matter shows, for example, named Plaintiff Mr. Friedman purchased the e-book title *Hound Dog*, published by Simon & Schuster, on April 5, 2011 for \$9.99. Just prior to agency the e-book format transacted at \$14.99. Immediately upon agency, the price of the title fell to \$11.99, before eventually declining to \$9.99 for an extended period of time -- including the date of Mr. Friedman's purchase.⁹⁵ Similarly, discovery states that on September 26, 2011 Mr. Friedman purchased *The Strain*, published by HarperCollins, for \$1.99. Prior to the switch to agency, the e-book title was priced by Amazon at \$9.99.⁹⁶

81. Inspection of Figures 10A-10F (discussed above) finds numerous titles that show prices remaining the same or falling relative to their levels immediately prior to the onset of agency. In fact, as seen in Figure 17, the majority of Publisher Defendants' titles' prices are in the category of "fell or did not rise" upon the advent of agency marketing (taking the onset of agency to cover the first four weeks of agency for a publisher, and measuring changes relative to prices in the week prior to the advent of agency). The "fell or did not rise" category applied in the first four weeks of agency to tens of thousands of titles and hundreds of thousands, if not millions, of class members' purchases (Figure 17). Even looked at volumetrically we find that approximately 60% of units sold within the four weeks after the shift to agency did not experience pricing above pre-agency levels.⁹⁷

- a) Prof. Noll's asserted (and assumed) "common fact" of injury necessarily implies that the prices of the tens of thousands of e-book prices that did not fall at the onset of agency were, nevertheless, raised by the unlawful conduct *relative to what they otherwise would have*

⁹⁵ CLSPLF0000005.xls and Transactions Database.

⁹⁶ CLSPLF0000005.xls and Transactions Database. The pricing for *The Strain* reflects the dispersion and churning discussed extensively above. At the onset of agency, the price of the title increased from \$9.99 to \$11.99 before falling to \$8.99 in June 2010. At the time of Mr. Friedman's purchase, the (modal) price of the e-book had declined from \$8.99 to \$1.99.

⁹⁷ While my focus here is predominantly on the question of common versus diverse impact and the reliability of Prof. Noll's aggregate and individual damages calculations, it has previously been shown that following a brief period of higher prices upon the shift to agency marketing, overall average e-book prices then declined to below pre-agency levels. (See Expert Report of Dr. Michelle Burtis on Behalf of Apple Inc., Holtzbrinck Publishers, LLC D/B/A Macmillan and Penguin Group (USA) Inc. in *United States v. Apple*, No. 12-cv-2826 (DLC), at ¶26) Isolation of price-raising effects, if any, of the unlawful conduct in a setting of overall declining prices, of course, requires proper specification of a model for explaining the evolution of e-book prices with and without the shift to agency. Below, I examine Prof. Noll's attempts to do this (see, especially, Section V).

been in the but-for setting. This requires a “just so” story: But for the unlawful conduct, Prof. Noll’s framework says that it just so happens that Amazon was just about to reduce the prices of each of those tens of thousands of titles’ on a common date (e.g., April 3, 2010) and, but for the unlawful conduct, we would have seen an abrupt drop in all of their prices. Moreover, within any of Prof. Noll’s groupings of titles, that abrupt drop in prices would have been precisely equal to the overcharge he calculates. This is required for any unchanged actual price to equal the sum of Prof. Noll’s but-for price and his overcharge amount.

- b) Similarly, in the case of titles that exhibit actual price reductions when agency marketing went into effect, Prof. Noll’s analysis necessarily implies that it just so happens that Amazon (or any other given retailer) operating on the wholesale model was going to reduce its retail prices of precisely those titles on precisely the day that agency began. Thus, goes the story, we were putatively prevented from observing these price reductions because unlawful conduct intervened on the very day that retailers operating on wholesale were going to drop their prices. Moreover, these unobserved but-for price reductions were going to uniformly be larger in absolute value than Prof. Noll’s overcharge amount. This is required in order for the sum of Prof. Noll’s but-for price and his overcharge amount to add up to an actual price upon agency that is lower than the actual price prior to the onset of agency.⁹⁸

82. Prof. Noll has performed no analysis of Amazon’s or any other retailer’s pricing that would indicate that the foregoing “just so” stories plausibly explain why the majority of titles’ prices either fell or did not change upon the onset of agency. As noted, these stories arise as a necessary consequence of his modeling assumptions. Scientific method, including economics, recognizes this kind of “just so” reasoning – also known as the *ad hoc* fallacy – as basic error.⁹⁹ As we have seen, however, consideration of the structure and impact of publishers’ agency agreements leads to the expectation that we would, indeed, expect to see – without having to appeal to *ad hoc* “just so”

⁹⁸ The same methodologic problem plagues the implications of Prof. Noll’s methodology for the observed patterns of change in initial e-book price points that demonstrably occurred upon the onset of agency. See the discussion of Figures 18A-K below.

⁹⁹ “Just So Story” in *Philosophy Dictionary*, accessed at <http://philosophy.enacademic.com/1307> on November 11, 2013; Hoover, Kevin, Selva Demiralp and Stephen Perez, “Empirical Identification of the Vector Autoregression” in Castle, Jennifer and Neil Shephard (eds.), *The Methodology and Practice of Econometrics: A Festschrift in Honour of David F. Hendry* (New York: Oxford University Press, 2009), at 42.

reasoning – many e-book titles’ prices not changing or falling upon the onset of agency.

The Impact of the Shift from Retailer Price Setting to Publisher Price Setting

83. In addition to the direct effects of the agency agreements, the basic economics of pricing of differentiated products indicate that it would *not* be expected that publishers would raise all e-book titles’ prices upon transferring pricing authority from retailers to publishers with the onset of agency marketing. Let us consider these economics.
84. As noted above, Plaintiffs assert that once Publisher Defendants obtained retail pricing authority under agency marketing they used that authority to raise all of their e-book prices – either absolutely or at least relative to those prices’ but-for levels. Specifically, Plaintiffs claim that the Publisher Defendants, having obtained retail pricing authority under the agency model, “increased consumer prices for eBooks approximately thirty to fifty percent, stabilized eBook pricing, and completely changed the competitive pricing landscape that had existed for decades in the industry”.¹⁰⁰
85. In support of this claim the evidence presented by Plaintiffs and previously relied upon by the Court is described by Plaintiffs as showing increases in the “Average Prices of Bestselling eBooks”¹⁰¹ and “Average Prices of All eBook Titles”.¹⁰² Similarly, Plaintiffs’ expert Prof. Noll states that “[o]ne purpose of the collusive agency model was to cause prices of e-books to be higher, thereby causing harm to consumers that is equal to the difference between the elevated e-book prices under the collusive agency model and the lower e-book prices that would have occurred had this collusive agreement not been adopted... This expectation was confirmed as *average* e-book prices of the Publisher Defendants rose immediately after the agency model came into effect.”¹⁰³
86. Regardless of whether *average* e-book prices were elevated by the unlawful conduct of Defendants, examination of averages does not provide evidence as to the fact of injury and damage of individual class members, and the claimed average amounts of price elevation cannot properly be attributed to all potential class members without further analysis that reliably measures the magnitude of damage putatively suffered by individual class members. The

¹⁰⁰ Amended Complaint at ¶19.

¹⁰¹ Amended Complaint at ¶180 (emphasis added).

¹⁰² Amended Complaint at ¶180 (emphasis added).

¹⁰³ Noll Declaration at 12 (emphasis added).

oft-noted impropriety of taking a class-wide *average* effect to stand for a common fact and magnitude of effect across the individuals that make up a proposed class is particularly relevant here in light of the extreme diversity of consumers and products (titles) in the e-book marketplace. A more granular analysis is required here.

87. The quite extreme diversity of publisher product offerings, put forth in the marketplace to meet the similarly diverse preferences and demands of consumers, coupled with the evident dispersion and ubiquitous churning of e-book prices, give foundation in the case at hand to the ABA's noted admonition that "[a] conspiracy may have little or no effect on some customers for many different reasons."¹⁰⁴ In the case at hand, even assuming the use of price ceilings and MFN provisions in Apple's agency agreements with Publisher Defendants amounted to a form of price fixing, pricing below the price ceilings and/or differential adherence to or monitoring and enforcement of MFN provisions would give rise to the kinds of variegated effectiveness of price fixing described by the ABA. Even more tellingly, the foregoing version of price fixing pertains to the pricing across retailers of a given title by a given publisher. It does not describe price fixing across all titles by disparate publishers. In fact, any claims of uniformly *effective* price fixing across the thousands of titles of the Publisher Defendants are starkly inconsistent with the pervasive dispersion and churning we see in e-book prices following the onset of agency.
88. Beyond the question of the absence and/or imperfection of price fixing across thousands of disparately priced titles, Plaintiffs' claims that publishers response to agency was to raise *all* titles' prices is not a description of the response reasonably expected of profit-seeking publishers. Plaintiffs assert, among other things, that "the Publisher Defendants coordinated their efforts and almost simultaneously abandoned established business practices to ensure that they achieved critical mass sufficient to wrestle control of pricing from retailers."¹⁰⁵ Yet, the Publisher Defendants' "wrestl[ing] control of pricing from retailers" implies a fundamentally changed competitive dynamic in retail pricing upon the move to agency – a changed dynamic that precludes assumption or assertion of a common fact of antitrust injury across the members of the proposed class. In fact, basic economic principles imply that the prices of some e-books would be expected to increase, and some e-book prices would be expected to decrease after Publisher Defendants obtained authority to set retail prices by adopting the agency model of marketing.

¹⁰⁴ ABA Section of Antitrust Law (2005) at 204.

¹⁰⁵ Amended Complaint at ¶14.

- a) Before the Publisher Defendants obtained authority to set retail prices for their e-book titles, Amazon set the retail prices for [REDACTED] of e-books sold, encompassing approximately [REDACTED] titles across the five Publisher Defendants and Random House.¹⁰⁶ In doing so, Amazon is properly represented as maximizing the returns to *Amazon* across the portfolio of multiple publishers' many titles. The advent of agency meant that individual publishers were in position to maximize returns to their respective, separate portfolios of their own titles. In so doing, relative to conditions in which Amazon controlled retail pricing, disincentives to reducing any given title's price to gain sales of that title would be reduced.
- b) In particular, to any extent that a price reduction by a publisher in the agency setting attracted sales at the expense of another publisher's title(s), the price-reducing publisher would suffer no lost profits on such lost sales.¹⁰⁷ On the other hand, under the wholesale marketing model, a retailer such as Amazon would experience sales lost on one of its e-tailed titles as a result of price reductions on another of its titles as a loss to itself. The implication of these basic economics of profit maximization is that the move to agency would be expected to find publishers raising some titles' prices, but also lowering some titles prices relative to but-for levels under the wholesale model of e-book marketing.
- c) Not only would the shift from Amazon-dominated retail price setting to multiple publisher retail price setting be expected to result in both increasing and decreasing prices across the array of e-book titles, but a similar pattern would be expected to arise from publisher-to-publisher interaction in the marketplace. The basic economics of differentiated products (like book titles) teach that the prices of such products do not necessarily respond in unison to changes in supply and demand conditions. In particular, when one seller raises (or lowers) the price of a differentiated product, sellers of competing differentiated products can readily find it profit-maximizing to lower (or raise) their prices.¹⁰⁸

¹⁰⁶ See workpapers.

¹⁰⁷ A reduction in the retail price by \$1 under agency reduces the net price received by the publisher (author) by less than \$1. As a result, the adoption of agency can expand output by encouraging publishers (author) to discount their products.

¹⁰⁸ Bulow, Jeremy, John Geanakoplos and Paul Klemperer, "Multimarket Oligopoly: Strategic Substitute and Complements," *Journal of Political Economy*, Vol. 93 (3), at 501.

- (1) Consider the consequences of a given publisher raising the price of one of its titles. All else equal, doing so may give one or more other publishers incentive to try to capture price sensitive customers ready to substitute away from the now-more-expensive first title. The first publisher can then find itself selling to relatively price insensitive consumers, while one or more other publishers attract the price sensitive customers with lower prices.
 - (2) In fact, with approximately 100,000 e-book titles by Publisher Defendants and Random House sold between April 2010 and April 2012, variations across reading devices, across multiple different e-reader platforms, and varying degrees of customer loyalty to various reading devices, authors and subject matter, it is wholly expected that the prices of some e-books purchased by some customers would move downward in response to other prices moving upward under agency.
89. The expected “some up, some down” pattern to e-book prices upon the shift to agency is seen in the prices of new e-book releases. Figures 18A-18E show new e-book release prices by Publisher Defendants before and after the onset of agency. Figures 18F-18K show the same information by Amazon-designated genre. While prior to agency we see variation in release prices, there was concentration at \$9.99. The figures show that following the shift to agency, there is a spreading out of the focal points for the pricing of newly released e-books, with focal points encompassing 99 cent points both above *and* below \$9.99. Thus, we see post-agency concentrations at \$10.99, \$11.99, \$12.99 and above, as well as \$8.99, \$7.99, \$6.99 and below.
90. More generally, there is no uniform pattern of all Publisher Defendant e-book prices rising upon the advent of agency. We saw this above in Figures 10A-10F, 11A-11C, 12A-12F, and Figure 17. The consequence is that millions of e-book transactions during the agency period occurred for titles whose prices stayed at or below their pre-agency levels.
- a) Figures 19A-19E present the number of titles for each Publisher Defendant whose prices after the onset of agency stayed at or below their pre-agency price levels. In the immediate period after the move to agency, many titles’ prices stayed at or moved below their pre-agency price levels. Even after several weeks following the start of April 2010, a vast number of titles’ prices stayed at or below their pre-agency price levels.
 - b) Figures 20A-20E measure the cumulative volume of sales for each Publisher Defendant’s titles with post-agency pricing that continually stayed at or below their pre-agency price grouped by for cohort (i.e.,

titles that share the same age based on their week of release). These empirical findings are inconsistent with claims of a pricing “structure” that moved up as a whole upon agency. They also belie the existence of a ubiquitous, everywhere-effective price fixing conspiracy that elevated all e-book prices upon the move to agency.

91. As we have seen above (see Figure 8), data show that large numbers of [REDACTED] only purchased one title. While individualized inquiry would be required to reach definitive quantification, [REDACTED] provides indication that substantial numbers of class members are likely to have purchased one or a small number of e-books during the damage period.

- a) The intersection of this group with the large numbers of e-books titles that do not exhibit price increases upon agency and/or that require the noted “just so” reasoning under Prof. Noll’s framework for it to be said they had their prices raised by the unlawful conduct represent class members who were not injured by the unlawful conduct.
- b) Indeed, this conclusion applies to Amazon Kindle users as well. Amazon, too, indicates awareness that “there may be people who buy our Kindle Fire device who don’t really read much.”¹⁰⁹

92. The three remaining named class representatives all purchased more than one e-book during the damages period. As such, their experience does not capture the facts pertinent to single-title buyers. At the same time, of the 24 named class representatives originally named in the case, at least 17 of these individuals purchased one or more titles by a Publisher Defendant whose post-agency price continually stayed at or below that title’s pre-agency price (see again Figure 19A-19E).¹¹⁰

93. In sum, even though prices of thousands of titles, accounting for millions of consumers’ purchases, fell or did not rise upon the onset of agency and thereafter, Prof. Noll concludes that the unlawful conduct had elevated those prices relative to what they otherwise would have been. Yet, as we have seen above, Prof. Noll’s assertion that his analysis shows a common fact of injury across the class, requires the invocation of *ad hoc* “just so” reasoning to the effect that it just so happens that right at the moment of the advent of agency,

¹⁰⁹ Direct Testimony of Russell C. Grandinetti, United States of America v. Apple Inc. and The State of Texas, Civil Action No. 12-cv-2826 (DLC); The State of Connecticut, *et al.*, v. Penguin Group (USA) Inc., *et al.*, Civil Action No. 12-cv-03394 (DLC) at ¶26.

¹¹⁰ Plaintiff Data on named class representative purchases.

the unlawful conduct raised prices so as (1) to precisely offset the imminent but-for price reductions in the case of titles whose prices did not fall, and (2) to only partially offset the imminent price reductions in the cases of titles whose prices actually fell upon the onset of agency. The proper lesson to be drawn from this and from figures such as Figures 17 and 18A-18K is that Prof. Noll has constructed a damages model that cannot coherently be said to capture the but-for world. As such, the model is invalid as a means of reliably measuring the fact and magnitude of damages in the aggregate and at the level of individual class members.

D. E-book Buyers Who Would Not Have Purchased E-books Absent Apple's iBookstore

94. The record demonstrates the collective shift of multiple publishers to the agency model of e-book marketing was a pre-requisite for Apple's launching of its iBookstore. The data reviewed in Section III above indicated that approximately 60% or more of Apple iPad owners during the damages period did not also own a Kindle. Moreover, the data indicated that the class members who owned Apple devices and who also had not downloaded the Kindle or another of Apple's competitors' e-reading apps purchased [REDACTED] e-books from the iBookstore [REDACTED] [REDACTED] and obtained approximately another [REDACTED] from the iBookstore [REDACTED] from March 28, 2010, through March 31, 2012 (see data for Figure 7).

95. While data and information acquired by individualized inquiry would be required to specifically identify pertinent class members, these data and the phenomenon of high brand loyalty among Apple customers (see above in Section III) tell us it is likely that substantial numbers of class members would not have purchased e-books in the damages period but-for the launching of the iBookstore. That launching resulted in the Apple-exclusive consumer having access to the benefits of e-reading that would not have been enjoyed in the but-for world in which the iBookstore was not launched. Such class members were made better off by the unlawful conduct – which was the pre-requisite for the launching of the iBookstore.¹¹¹
96. By the same token, absent individualized inquiry, the impact of the unlawful conduct – injury or benefit – on class members who purchased *more* e-books

¹¹¹ As the iBookstore has been revealed to be their preferred platform, even if these consumers were to obtain e-books through an alternative avenue in the absence of the iBookstore, these consumers would have been harmed in its absence.

than they otherwise would have as a result of the launching of the iBookstore (e.g., because of their preference for Apple products and/or their hastened introduction to e-reading through e-books purchased from the iBookstore) is indeterminate. In fact, trade surveys and data on the extent to which Apple e-reader owners did not use non-Apple apps to access e-books indicate that a substantial percentage of e-book readers were introduced to e-reading via their use of iPads to access Apple's iBookstore. Class members of this type experienced the benefit of e-book purchases opened up to them by the introduction of the iBookstore that was triggered by Publisher Defendants' move to agency marketing. It cannot be concluded based on facts common to the class that these class members were injured, or to what extent they were injured, by the unlawful conduct.

E. E-Book Buyers Who Purchased Self-Published E-Book Titles That Would Not Be Available Absent the Unlawful Conduct

97. As discussed in Section III above, the impact of the debut of the iBookstore on the marketplace was not limited to creating another channel through which consumers could access e-books, but also expanded the avenues through which authors could self-publish their works as e-books. Apple's iBookstore, with its 70% royalty to authors and potentially broad distribution, expanded the publishing opportunities available to authors. Before the debut of the iBookstore, it was quite typical for traditional publishing houses to offer the customary royalty rate of 25% to authors,¹¹² and even Amazon's Kindle Direct Publishing only offered authors a 35% royalty. With Apple's entry into the e-book marketplace looming on a 70-30 split basis, Amazon announced an increase in royalty rates under its self-publishing program to 70%, for a broad category of titles.¹¹³
98. The economics of increased royalty rates offered to authors is quite straight forward: An increase in the royalty rate increases the effective compensation an author receives for each unit sold of his or her titles and, thus, higher royalty rates encourage authors to publish more works, bringing forth additional titles into the marketplace. The implication of these economics is that absent the unlawful conduct, royalty rates offered to self-publishing authors would not have increased to the same extent that they did at the more established retailers, such as Amazon, and, as a result, there would be fewer

¹¹² 2010 Book Trade Almanac at 449.

¹¹³ Cheng, Arstechnica.com, January 20, 2010.

self-published e-books available for consumers to purchase.¹¹⁴ The data shown in Figure 2 (discussed above) are consistent with the expectation that the onset of agency and its improved terms for self-publishers spurred self-publishing, with an increase in the trend toward self-publishing after agency was implemented.

99. Consumers who purchased self-published e-books would be worse off absent the unlawful conduct if the self-published e-book they purchased were not available in the absence of the iBookstore. Of course, determining whether any particular e-book purchased by any given consumer would not have been published in the absence of the iBookstore requires inquiry into such issues as: Was the title purchased by the consumer self-published? Would the author of that e-book have self-published the title if he or she were paid the putative lower royalty rate absent the iBookstore? And measurement of the putative harm to any individual e-book customer arising from the inability to purchase a self-published title due to its absence in the marketplace requires inquiry into what that individual customer would have purchased (if anything) had her or his chosen self-published title been unavailable.

F. E-Book Buyers Who Purchased an E-Reader during the Damages Period

100. As recognized by Plaintiffs' expert Prof. Noll, e-books and e-readers are complementary products.¹¹⁵ Both are needed to produce what the consumer wants – to read a book delivered via visual electronic medium. Scholars and observers of the book industry recognize that “[p]eople do not buy a Kindle, a Nook, or an iPad just to observe the intrinsic beauty of these electronic devices. They want to read something, to be entertained, informed, or educated.”¹¹⁶ To acquire this e-reading experience, the consumer incurs the combined cost of purchasing an e-reading device and one or more e-books. In the case at hand, any given consumer (class member) would be adversely impacted – injured – under Plaintiffs' theories only if and to the extent the consumer's cost of the e-reading experience was increased as a result of the unlawful conduct. The basic economics of complementary products indicate that we would not expect a common fact of conspiracy-induced increases in class members' costs of e-reading.

¹¹⁴ Prof. Noll takes no account of whether the 70% royalty rate would be available absent the iBookstore, yet assumes that all actual sales, including all sales of self-published titles, would also occur in the but-for world. Noll Deposition at 58:9-17 and 95:17-25.

¹¹⁵ Noll Deposition at 40-41.

¹¹⁶ Greco, *et al.* at 291.

101. Even if – indeed, especially if – there were an “across-the-board” increase in the prices of Publisher Defendants’ e-books as a result of the unlawful conduct, the prices of the key complementary product needed by consumers to enjoy e-books – i.e., the prices of e-readers – would be lower prices as a result of the putative conspiracy-induced increases in e-book prices. Basic economic principles imply that the same supply and demand forces that purportedly engender higher e-book prices upon the move to agency marketing would engender *lower* e-reader prices.
102. The basic economic principle at work here recognizes that e-books and e-readers are complements. Economically, this means that there is no basis to assert that a change in the pricing of one product (e-books) has no change in the pricing of the other product (e-readers). Basic economics teach that if two products are complements, an increase (or decrease) in the price of one product results in a decrease (or increase) in the demand for the other product because consumers’ combined cost of purchasing both products has risen.¹¹⁷ This decrease in demand for the other product induces a price response on the other product’s price. Specifically, the other product’s price will decrease because fewer consumers are willing to purchase it. In the context of the matter at hand, a putative “across-the-board” or even average increase in e-book prices would readily lead to the reduction of e-reader prices.
103. Sellers of e-readers, particularly Amazon and Barnes & Noble, whose e-readers are associated with their own e-bookstores, would be expected to have an incentive to respond to a general, average increase in e-book prices by decreasing the prices of their e-readers, i.e., the Kindle and Nook. Once the Publisher Defendants obtained retail pricing authority and raised average prices as Plaintiffs claim, sellers of e-readers would find the consumer demand for their e-reading devices reduced because the combined cost of e-reading has increased. With fewer consumers willing to purchase their e-reading devices, competition among sellers of e-readers would bring supply and demand back into balance at a lower level of pricing on e-readers. The data on the prices of e-readers are consistent with this competitive response to claimed increases in average e-book prices (see again Figure 5).
104. In the context of Apple’s launch of its iPad, these economics have particular import for Amazon and the price of its Kindle. The iPad offers consumers an alternative avenue to reading an e-book purchased from Amazon via the Kindle App when it is downloaded onto the iPad. Thus, even in the absence

¹¹⁷ Case, Karl, Ray Fair, and Sharon Oster, *Principles of Microeconomics*, 9th ed., Pearson Prentice Hall, 2009, at 55.

of Apple's iBookstore, the iPad would have been a close rival to Amazon's Kindle leading to more competitive pricing on the Kindle.

a)

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b) Apple's expert Dr. Jonathan Orszag reports that the Kindle e-reader was priced during the claimed damages period at

¹¹⁹ This is a result of the unlawful conduct, inuring to the benefit of any consumer, including class members, who purchased her or his Kindle during the damages period. With Prof. Noll's overcharge amount being on the order of \$2 per e-book purchased, this benefit would more than offset claimed damages on e-books for any class member buying a Kindle and up to books in the damages period. In fact, individualized inquiry into the facts and circumstances of the 24 current and former named class representatives indicates that information is available for 19 of these individuals. As shown in Figure 21, if we accept for the sake of argument the assumed common fact of elevated e-book prices and the quantification of that injury from Prof. Noll's framework for these 19 individuals, five of them realized reductions in their costs of *e-reading* – the costs they bore for both their e-book purchases and their e-device purchases – as a result of the unlawful conduct. These results contradict Prof. Noll's claims of a common fact of injury across the proposed class as a result of the unlawful conduct.

105. In summary, the implications of these economics are straightforward: Within Plaintiffs' own framework, those putative class members who purchased a reading device in the agency period would be expected to have paid, as a result of the unlawful conduct, a lower price for that device relative to the price they would have been expected to pay for the same device absent the

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unlawful conduct. As a consequence, such class members are properly recognized as having received a benefit not available to members of the putative class who purchased their e-reading devices prior to the switch to agency marketing by Publisher Defendants. The extent to which the benefit received by any such consumers outweighed the cost associated with an increase in the prices paid for Publisher Defendants' e-books as a consequence of the switch to agency pricing can only be determined through individualized inquiry and data collection via the kind of exercise that class certification presumes is unnecessary.

V. QUANTIFYING IMPACT: CAN DAMAGES BE RELIABLY CALCULATED USING A COMMON METHOD OR FORMULA?

A. Overview

106. When, as we have seen above in the matter at hand, prices of e-books move in a diversity of directions and magnitudes at any given time and across titles with no obvious pattern in response to changes in supply and demand factors wholly unrelated to the unlawful conduct, any regression approach must, as the ABA points out, "control for" the legitimate changes in prices.¹²⁰ Only after economic analysis has reliably separated movements in prices that result from the unlawful conduct from legitimate movements in prices arising from changes in marketplace conditions is it even possible to identify the fact (if any) and magnitude (if any) of adverse impact and antitrust injury that any consumer would have experienced as a result of the unlawful conduct. If the effect of this conduct can be reliably isolated in this manner, then measurement of a consumer's damages would be obtained by differencing the price the individual actually paid and the price the individual would have really paid absent the conspiracy, i.e., the true but-for price. Thus, two questions arise: (1) How do we identify the unobserved but-for price each individual consumer would have paid?; and (2) Is this price calculated reliably?

107. While we observe what each consumer actually paid, we do not observe what each consumer would have really paid absent the unlawful conduct. Instead, we only know that there would have been a range of prices that each consumer may have paid absent the conspiracy because the transaction prices we observe for e-books before and after the onset of agency exhibit marked dispersion and churning. Thus, any single price from that range of but-for

¹²⁰ ABA Section of Antitrust Law (2005) at 210-211.

prices could be the price any given consumer would have paid absent the unlawful conduct.

- a) That is, the dispersion and churning we see in actual transaction prices both before and after the onset of agency implies that there are many possible prices that each consumer could have paid absent the conspiracy. When the range of putatively conspiratorial prices overlaps with the range of prices consumers would have paid absent the conspiracy (as in Figures 11 and 18A-18K), and particularly when prices churn (as evidenced by, for example, Figures 12 and 13), there is no reason to expect, without further research and evidence, that all consumers would have paid higher prices as a result of the unlawful conduct.¹²¹
- b) In fact, economics teaches that “[t]he problem is that there are very few constraints on how to assign a price from the range of prices absent the conspiracy to a given consumer. Therefore, it is quite plausible that some consumers could have paid a lower price relative to the price each would have paid absent the conspiracy. Without additional analysis to reasonably rule out that possibility, it is inappropriate to assume that all consumers would have been injured by the alleged conspiracy.”¹²²

B. How Does Prof. Noll Assign “But-For” Prices to Consumers and Calculate Their Damages?

108. Given the noted inherent challenges of assigning a but-for price to each e-book purchase that a consumer has made during the agency period, the natural starting point in analyzing Plaintiffs’ expert’s damages modeling is to ask: How does Prof. Noll assign a but-for price to each e-book transaction made by each consumer? The answer according to Prof. Noll is: “The method that I chose to calculate damages is the ‘before-after’ approach, which uses prices that were not affected by the anticompetitive conduct to calculate competitive benchmark prices for e-books sold by the Publisher Defendants during the period in which anticompetitive conduct occurred. To calculate damages, economists working under my direction estimated an econometric model that implements a hedonic price formula that measures the effect of collusion by including an indicator variable for the period that was affected by

¹²¹ The difficulty of using economic tools to determine but-for prices when transactions prices exhibit dispersion and churning is discussed in Lemon, Andrew Y. and Steven R. Peterson, “Rigorous Analysis to Bridge the Inference Gap in Class Certification,” *Journal of Competition Law & Economics* (2011).

¹²² Lemon, Andrew Y. and Steven R. Peterson, “Using Economics to Identify Common Impact in Antitrust Class Certification,” *Economics Committee Newsletter, ABA Section of Antitrust Law*, Vol. 11(1).

anticompetitive conduct.... The estimated equation yields a formula for calculating the predicted price of each e-book title in each four-week period without the effect of the anticompetitive conduct. Damages for each sale of each e-book title in each period are then the actual price minus the predicted, but-for price.”¹²³

- a) He further elaborates on his methodology saying: “To calculate damages for a single sale of an e-book title during a particular four-week period when the collusive agency model was in force, I first use the regression model to calculate the predicted ‘but-for’ price of each e-book title for each four-week period during the collusion period under the assumption that no price collusion had occurred. This calculation is performed by setting the indicator variable for price collusion equal to zero during the collusion period. I then calculate the difference between the actual price and the predicted competitive benchmark price for that book in that period.”¹²⁴
- b) Symbolizing the “actual price” as P_A and the “predicted competitive benchmark price” as $P'_{\text{But-For}}$, Prof. Noll is proffering the “difference” he describes – $P_A - P'_{\text{But-For}}$ – as the proper measure of the damage incurred by a consumer on any given e-book.¹²⁵
- c) This methodology introduces egregious unreliability into a damage calculation. The actual price that we observe a consumer paying can be broken into two parts: (1) the part that Prof. Noll’s modeling accounts for (or “explains”) as the result of lawful and/or unlawful forces, and (2) the part the modeling cannot explain (known as the “residual” or the “prediction error”). Thus, if we call the part of actual prices explained by normal market forces and by the unlawful conduct “X”, and the remaining part of the actual price that is not explained by either normal forces or the unlawful conduct is called “U”, the actual price paid by a consumer is $P_A = X + U$. The latter part, U, is just unexplained. It can be either positive or negative. That is, the modeling may predict an actual price based on lawful and unlawful forces that is higher or lower

¹²³ Noll Declaration at 6.

¹²⁴ Noll Declaration at 24-25. See also Noll Deposition at 191:10-19.

¹²⁵ See also Noll Deposition at 156, 171-74, 199-202, and 239.

than the price actually observed, resulting in a negative or positive residual U , respectively.¹²⁶

- d) Applying Prof. Noll's foregoing description of his damage calculation then amounts to damages being (1) the difference between the *explained* part of the price actually paid and the predicted but-for price *plus* (2) the part of the actual price that is explained by *neither* lawful economic forces *nor* unlawful conduct:

$$\text{Damage} = P_A - P'_{\text{But-For}} = X + U - P'_{\text{But-For}} = X - P'_{\text{But-For}} + U \quad .$$

The important term here is the “+ U ”. It means that Prof. Noll's stated method of damage calculation counts as positive or negative “damages” the part of actual prices that his modeling itself can attribute to *neither* normal market forces *nor* the unlawful conduct. In other words, the unexplained part of actual prices, *which the modeling tried, but failed, to explain by normal supply and demand factors and conspiracy*, is a part of Prof. Noll's stated measure of damages purportedly caused by conspiracy. This is a logical contradiction: The subject portion of damages cannot be both caused by “conspiracy” and unexplained by “conspiracy”. In short, contrary to the most basic of arithmetic and professional methods, Prof. Noll's proffered damages formula treats price changes that his model does not explain by either normal supply and demand factors or “conspiracy” as nevertheless being damages caused by conspiracy.

109. Consider the implications of Prof. Noll's invalid methodology. Only by happenstance would a given class member purchase have $U = 0$. For class member purchases made at actual prices which are under-predicted by his modeling, the U term in the damage calculation would be positive and the calculation would employ the U term so as to exaggerate damages. Class members with purchases of this type would benefit from Prof. Noll's error. Conversely, for class member purchases at actual prices which are over-predicted by his modeling, the U term in the damage calculation would be negative in value and would have the effect of pulling damages downward. Class members with purchases of this type would be harmed by Prof. Noll's error.

¹²⁶ Although I explain how Prof. Noll's proffered methodology introduces unreliability in the context of prices measured in dollars, the same unreliability holds when this proffered methodology uses prices in logarithms of dollars (see Appendix A – Mathematical Appendix to my declaration).

110. Notwithstanding Prof. Noll's repeated descriptions of the steps of his aggregate and individual damages calculations *per* the foregoing, inspection of his workpapers reveals he used a different formula.¹²⁷ Faced with this as a possibility, Prof. Noll reaffirms his stated approach.¹²⁸ Nevertheless, as set out in the Mathematical Appendix ("Appendix A") to my declaration, the formula actually used in his calculations computes a percentage overcharge formula based on the ratio of the *explained* portion of actual prices to his predicted but-for price. While this avoids the noted error of turning what is not explained by either normal, lawful forces or by the unlawful conduct into damages "caused" (*sic*) by the unlawful conduct, Prof. Noll's actual calculations commit a critical error of another type. I turn to this now.

C. Prof. Noll's Assertion of Common, Class-Wide Impact Is Based on His Measures of Average Impact

111. As shown in Appendix A, in computing percentage overcharges, Prof. Noll's calculation imposes the requirement that all transactions in any one of his publisher/genre/ NYT-bestseller-or-not/newly-released-or-not/hardcover-or-not/ paperback-or-not groupings had the same percentage overcharge. As I explain more fully below, in adopting such calculations, Prof. Noll is strictly assuming what needs to be proved for purposes of class certification – i.e., his calculations assume common impact. In doing so, Prof. Noll's analysis has demonstrably failed to satisfy the requirement of reliable modeling.

112. Economics refers to the kind of pricing equation Prof. Noll estimates in his model as a "reduced-form pricing equation" because it "reduces" the decision-making process of marketplace participants with pricing authority to a mathematical formula of explanatory variables that the researcher posits as causally determining prices. This is distinct from an alternative approach which attempts to directly model the decision-maker's pricing behavior (see discussion of pricing practices above). In fact, Prof. Noll acknowledges this core feature of his model, noting that "the model is a reduce form pricing model that has both supply and demand characteristics in it... it's intended to be a marketing, delivery and price estimated through a reduced form model. It's not intending to be anybody's pricing algorithm."¹²⁹

113. The ABA warns researchers about the use of reduced-form pricing equations when investigating common impact: "The reduced-form pricing equation

¹²⁷ See Noll Deposition at, e.g., 156, 171-74, and 199-202 and Prof. Noll's workpaper file "damages.do".

¹²⁸ Noll Deposition at 239.

¹²⁹ Noll Deposition at 60.

assumes that a conspiracy has the same effect on every purchaser and focuses on an average effect, which may hide variation across class members. If one is attempting to test whether there is an impact on all members of a proposed class, however, that assumption is not valid, as it assumes the very proposition that is being tested.”¹³⁰ This problem with reduced-form regression modeling is at the core of Prof. Noll’s modeling and ultimate “damage” calculations: Prof. Noll’s approach (perhaps unwittingly) demonstrably assumes, rather than shows or tests, a fact of common class-wide injury.¹³¹ With his reduced-form pricing equation and its generation of *average* effects on the prices paid by a putatively average consumer, he did not examine the matter. I find that the data support no assumption of common impact.

114. The central requirement for Prof. Noll’s assumption of common impact is that, after accounting for any effects of agency on e-book pricing, the competitive dynamics of e-book pricing (i.e., which titles’ prices would rise, which would fall, etc.) would be the same absent the unlawful conduct. Even though economic principles teach otherwise and we have seen considerable evidence to the contrary (see Section IV above), this central requirement is left unverified by Prof. Noll.

- a) Figure 22 explains the way in which Prof. Noll’s methodology assumes what needs to be proven. The figure presents the illustrative example of four e-book titles and considers the challenge of assigning each title a but-for price. As the figure shows, various combinations of some e-books suffering price elevation while others suffering no price elevation or price depression can all readily yield the same *average* effect that Prof. Noll’s methodology attributes to unlawful conduct. His methodology has no means of doing otherwise.
- b) The left-hand panel of Figure 22 shows the principle at work when *Prof. Noll’s* methodology assigns a but-for price to each of four titles. His methodology starts by measuring an average transaction price across the four titles during the agency period of \$10.50. The methodology then estimates the average “but-for” price for this group of titles to be \$7.50. By subtracting \$7.50 from \$10.50, the methodology estimates an average overcharge of \$3.00. Prof. Noll then assumes that this average overcharge applies to each of the four titles and subtracts the average overcharge to obtain a “predicted, but-for price.” Thus, but-for prices are obtained under Prof. Noll’s

¹³⁰ ABA Section of Antitrust Law (2005) at 222 (footnotes omitted, emphasis added).

¹³¹ See Appendix A – Mathematical Appendix to my declaration.

methodology by assuming that the *average* overcharge commonly impacted each title.

- c) The center panel of Figure 22 shows an alternative assignment of but-for prices to each title that Prof. Noll's model has left uninvestigated. This alternative has the same average overcharge, but differs in that it does not assume that the average overcharge commonly impacted each title. Instead, here Title A had an overcharge of \$12.00 while the other three titles had no overcharge. Applying Prof. Noll's methodology here readily generates false positives – i.e., he attributes injury to consumers of Titles B, C, and D even when there is none.
- d) The right-hand panel of Figure 22 shows another alternative assignment of but-for prices to each title that Prof. Noll's model has similarly left uninvestigated. Here, too, we see the same average overcharge, but now Title A has a \$12.00 overcharge and Title B a \$6.00 overcharge, while Titles C and D each have a *negative* overcharge of \$3.00. A negative overcharge means a title's price was decreased by the unlawful conduct and that consumers who purchased it benefitted as a result. Applying Prof. Noll's methodology here readily generates false positives – i.e., he attributes injury to consumers of Titles C and D even when there is none – and hides the variation that Prof. Noll's method purports to rule out, variation showing that Titles C and D had lower prices as a result of the unlawful conduct.
- e) In short, Prof. Noll's damages methodology assumes that what underlies his average percent overcharge is a kind of perfect mapping of dispersed actual prices into lower, but-for prices such that the absolute and relative positions of titles' prices within any of his groupings are unchanged in going from the actual setting to the but-for setting.¹³²

115. The validity (or more precisely, *invalidity*) of Prof. Noll's approach when applied to the data is readily seen in the data of Figures 18A-18K. As discussed above, these figures show the initial release prices for titles by Publisher Defendants and Amazon-designated genres as observed before and upon agency marketing. Under Prof. Noll's calculation method, the overcharges he calculates for the damages period (i.e., after the iBookstore launch) have the effect of simply shifting the distributions of prices we see in

¹³² Technically speaking, the perfect mapping assumed by Prof. Noll requires that the unexplainable portions of actual prices (known as "error terms") be perfectly correlated and equal in magnitude to the unexplainable portions of but-for prices. Moreover, Prof. Noll's calculations are performed using the logarithm of prices. The principle and alternatives shown in Figure 22 are unaltered if we express prices in logarithms, rather than dollar levels.

the damages period in Figures 18A-18K downward by the amount of his average overcharges.

116. In implicitly calculating but-for prices in this way, however, Prof. Noll leaves the overall shape of the distribution of but-for prices – its spread across the range of prices and the concentration on certain price points – looking fundamentally the same as the distribution of actual prices during the damages period. Yet, it is clear from Figures 18A-18K that the onset of agency altered the distribution of new release prices, and did so abruptly. Prof. Noll's calculations do not return e-book prices to their but-for levels; they merely subtract group-average amounts from post-agency prices, leaving the distribution of prices generated by the new competitive dynamics introduced by agency unaccounted for.

- a) These results tell us directly that Prof. Noll's model does not reliably represent how prices – but-for prices – would have behaved absent the unlawful conduct. As noted in Section IV above, it is clear that the shift of authority over retail e-book prices from retailers such as Amazon to publishers would be expected to result in markedly different pricing strategies – something we can see in Figures 18A-K.
- b) Prof. Noll's implicit but-for prices do not account for this. Indeed, they only attempt to account for putative increases in *average* prices within his broad groupings of titles – some of which contain tens of thousands of titles. They leave the basic distribution of prices across price levels post-agency fundamentally unaffected and merely shift the distribution downward by the amount of asserted overcharges.
- c) The result is that Prof. Noll's but-for prices cannot be taken to represent the but-for world. This means that his damages calculations cannot be taken as reliable measures of damages since reliable measures of damages require reliable measures of but-for prices. The consequence is that Prof. Noll's analysis (as actually implemented in his workpapers) is unreliable for purposes of identifying and quantifying damages, whether for the individual consumer or in the aggregate.

D. The Role of Averaging in Prof. Noll's Calculations

117. In addition to (or as a manifestation of) Prof. Noll's assuming what needs to be proved regarding common impact, Prof. Noll's methodology is fatally flawed as a means of assessing the fact (if any) and magnitude (if any) of individual consumer injury as a result of its use of titles' four-week average prices to estimate a putative average percent overcharge for each of the broad groups set out in his Exhibit 1. By only examining various averages of titles' prices across groups of four-week average title prices and time, Plaintiffs'

expert's methodology has no other option but to measure *average* percent overcharges and then assume that the average percent overcharge in a group applied commonly to each price within the group regardless of the title or specific four-week period post-agency. Indeed, *per* the principle illustrated in the left-hand panel of Figure 22, this is how Prof. Noll's calculations obtain any given title's but-for price.

118. The kind of rigorous analysis that would test for, rather than assume, common impact on all members of the proposed class would begin by, for example, *first* reliably measuring each transaction's but-for price and then calculating that transaction's overcharge independently. If all transactions had positive overcharges calculated in this manner then, we could reasonably conclude that there is common class-wide adverse impact. The approach taken by Plaintiffs' expert puts the proverbial cart-before-horse by assuming that which needs to be proved.
119. To understand the extent to which Prof. Noll has averaged transaction prices across titles for the purposes of modeling damages and measuring average overcharges, we can begin by investigating how Prof. Noll chooses which titles to average together. In doing so, I find that his averaging ignores key determinants of e-book pricing and obscures the diversity of variation in titles' prices.
 - a) First, as discussed above in Section IV, Prof. Noll averages the transaction prices for a given e-book sold through a given retailer that occur in a given four-week period into a single four-week average price for that e-book title at that retailer. This averaging thus obscures the actual variation of individual titles' prices across the days and weeks of any of his four-week periods. Such individual variation is evident in, for example, Figures 11, 12 and 13.
 - b) Second, Prof. Noll places each title's four-week average price, covering approximately 150 million class member purchases and 340 million non-class member transactions, into one of 1008 possible groups for determining whether that four-week average price was elevated by the unlawful conduct.¹³³

¹³³ There are 1008 possible groupings because there are seven possible values for the identity of the publisher (i.e., each of the five Publisher Defendants, Random House, and "other" which aggregates all other publishers as a single entity for purposes of modeling pricing behavior), six possible categories (see discussion below), two possible values of whether the title is New York Times bestseller, two possible values of whether a hardcover version is available, two possible values of whether a paperback version is

- (1) Each group entails a unique combination of Prof. Noll's "hedonic"¹³⁴ variables. *Hedonic* refers to the attributes of differentiated products that make those products more or less attractive to consumers. In Prof. Noll's modeling, these hedonic variables consist of selected characteristics that Prof. Noll's analysis purports are the only measurable e-book characteristics that contribute to explaining the variation across titles' prices. These hedonic variables are: (1) the identity of the title's publisher; (2) the genre category to which Prof. Noll assigns the title; (3) whether a hardcover version of the title is available; (4) whether a paperback version of the title is available; (5) whether or not a title is a New York Times bestseller; and (6) how long the title has been released.¹³⁵
- (2) Hedonic attributes known to affect consumers' choices, such as authors' growing or shrinking reputations, the appearance of good or bad reviews, events such as a movie release of the title, so-called "buzz" and "word-of-mouth" effects, celebrity, expert or other endorsements, and real-time advertising and other marketing efforts by retailers, authors and/or publishers do not appear in Prof. Noll's attempt to explain the four-week averages of titles' prices.
- c) In addition to his limited set of "hedonic" factors, Prof. Noll's attempt to explain titles' four-week average prices includes additional "supply and demand characteristics".¹³⁶ These characteristics, however, apply on a blanket basis to all titles' prices, with no ability to explain the demonstrable differential levels and movements in those prices. In particular, to capture some effect of overall demand for e-books, Prof. Noll includes a variable measuring consumer expenditures on non-durable goods and a general time trend.¹³⁷ He also includes a dummy variable which indicates whether or not the e-book was sold under

available, and three possible values for a title's age (i.e., under 90 days, 91-364 days, and one year or more relative to the title's release). Thus, $7 \times 6 \times 2 \times 2 \times 2 \times 3 = 1008$.

¹³⁴ Noll Declaration at 6 and 17-18.

¹³⁵ Noll Declaration at 19-20.

¹³⁶ Noll Deposition at 60.

¹³⁷ Noll Declaration at 20-21.

agency marketing.¹³⁸ In Prof. Noll's modeling, these variables are adequate for determining four-week average e-book prices.¹³⁹

120. Third, Prof. Noll uses his "reduced-form pricing equation" to estimate a separate putative overcharge for each of 502 groupings of Publisher Defendant titles' prices during the damages period.¹⁴⁰ While the mathematical intricacies of Prof. Noll's regression may seem complex, the basic calculation is straightforward: The calculations in Prof. Noll's workpapers measure the overcharge for any one of Prof. Noll's grouping of e-book titles by calculating an average percentage overcharge for that group as the ratio of (1) the predicted actual average of four-week prices (P'_A) minus the predicted but-for average of four-week prices ($P'_{\text{But-For}}$) to (2) the predicted actual average of four-week prices (P'_A).

a) In other words, the calculated percentage overcharge is:

$$\% \text{ Overcharge} = (P'_A - P'_{\text{But-For}}) / P'_A$$

b) This claimed percentage overcharge is derived for an entire group of titles based on four-week average prices and does not directly tell Prof. Noll the overcharge that should be applied to any individual title within the pertinent grouping of titles. To arrive at that determination, Prof. Noll's framework commits the critical methodological error of assuming what needs to be proved by simply assigning the group overcharge to all titles' prices within the group over all days, months and years of the damages period, and by extension the transaction prices that make up his four-week average prices.

¹³⁸ The dummy variable indicates only whether a major publisher sold on agency. Noll Deposition at 55-56. Prof. Noll also includes a dummy variable to account for a brief period in early 2010 during which the "buy button" for MacMillan was not available on Amazon. He also includes so-called fixed effects for each title-retailer pair in his data, but these fixed effects do not offer substantive explanation of individual e-book title prices. Rather, they are an admission of non-explanation, taking the form, effectively, of "no explanation is offered as to the causes, but treat each title-retailer pair as distinct for some reason(s) from all others." Moreover, these fixed effects are *fixed*. That is, they are constant by construction of the model and cannot explain absolute or relative movements in individual title-retailer prices. See further discussion of Prof. Noll's use of fixed effects below.

¹³⁹ See, e.g., Noll Declaration at 19-22; and Noll Deposition at 62-63.

¹⁴⁰ Because there are only five Publisher Defendants, the number of groups that could have an overcharge is 720, obtained by multiplying: $5 \times 6 \times 2 \times 2 \times 3 = 720$. Because Publishers Defendants' titles' prices only fall into 502 of the 720 possible groups, Prof. Noll's regression effectively drops the other 218 groups from his analysis for the purpose of measuring putative overcharges on Publisher Defendants' titles.

121. A key criterion employed by Prof. Noll in creating his groupings of titles is his assignment of titles to highly aggregated genre-like categories. As noted in Section IV, Prof. Noll creates six such categories: Fiction, Non-Fiction, Advice, Teen/Child, Other, and Unidentified. These are shown in the top panel of Figure 23, along with the Amazon-designated genres of the actual titles that inspection of Prof. Noll's groupings finds within his six categories. The composition of these categories are striking for their within-category *heterogeneity*, entailing,

[REDACTED] in all six categories, and so on. If we are to accept for the sake of argument that similar e-books might have similar putative overcharges, Prof. Noll's groupings by highly aggregated genre-like categories provide no basis for acceptance of application of such reasoning to his groupings.

122. Figure 24 examines the nature of Prof. Noll's averaging for ten of his groupings. The top panel lists the ten groups. These groups are the top ten groups in Prof. Noll's modeling, measured by volume of e-books sold. For example, Prof. Noll's highest selling group is a combination of: (1) his designation of "Fiction", (2) published by Penguin, (3) for which there is a hardcover version, (4) for which there is also a paperback version, (5) neither of which is a New York Times bestseller, and (6) with the e-book title having been released for at least one year. For each group in the top panel of the figure, the bottom panel shows the group's number of included titles, the number of purchase transactions, Prof. Noll's estimated overcharge and damages, the number of his four-week average prices placed in that group, the minimum of his four-week averages in that group, the average of the four-week averages in that group, the maximum of the four-week average prices in that group, and the standard deviation of the four-week average prices in that group.

- a) Notwithstanding the implicit assumption that similar supply, demand *and* conspiracy forces operated in setting the prices of all titles in his groupings, Prof. Noll's highest selling group, for example, includes over 13,000 titles accounting for more than 9.8 million purchase transactions. For this group, he has over 215,000 four-week average prices which range from as low as \$0.19 to a high of \$45.00 with a mean of \$8.84.
- b) Prof. Noll calculates an *average* overcharge on four-week averaged prices for this group of 25% and assumes that this overcharge percent applies on a common basis to all 13,000+ titles and all 9.8+ million purchases regardless of retailer and regardless of when those purchases occurred in the claimed damages period. The result is a claim of over \$20 million in damages for this group.

- c) Let us ignore the fact that Prof. Noll's four-week average prices obscure purchases actually made within the four-week period at other than his four-week average and suppose two consumers: (1) a consumer who paid an actual price that just happened to equal \$0.19 (e.g., for the title that generated the lowest observed four-week average price in Figure 24), and (2) a consumer who paid an actual price of \$45 (e.g., for the title that generated the highest four-week average price). Under Prof. Noll's damages framework (as embodied in his calculations and workpapers), both of these consumers are assumed to have experienced the same 25% overcharge. If these purchases are made during the agency period, for the former consumer, this amounts to saying that the unlawful conduct raised the price of the purchased title by 5 cents and that the price should have been only \$0.14. For the consumer of the title that sold for an average four week price \$45, this amounts to saying that the unlawful conduct raised the price of the purchased title by \$11.20 and that the consumer should have paid a price of \$33.80.
- d) Nothing in Prof. Noll's modeling or calculations supports this blithe move from averages over 13,000+ titles, 9.8+ million consumer purchases, and more than two years of daily commerce.¹⁴¹ His modeling and calculations do not contain information that would permit him to actually identify and quantify (as opposed to assume) the impact, if any, of the unlawful conduct on the transactions that class members actually made during the period covered by his data.

123. Continuing to examine Prof. Noll's highest selling group in Figure 24, Figures 25A and 25B show Prof. Noll's four-week average prices for the top 25 titles by volumes sold. Clearly, even at the level of Prof. Noll's four-week average prices, we continue to see variation across titles' prices and churning of those prices. Yet, according to Prof. Noll's modeling, these titles should all have similar pricing by virtue of sharing the same characteristics as measured by his hedonic and supply and demand variables. There is no evidence that his model's explanatory variables are capturing – "controlling for" – the variation across titles in the same group. In fact, Prof. Noll's four-week average prices in his top selling group are so rife with churning that graphing all of the roughly 13,000 titles' prices in Figures 25A and 25B is not possible.

¹⁴¹ Prof. Noll seems to suggest that his overall "R-squared" (i.e., percent of price variation accounted for by his reduced-form regression model) justifies his common application of estimated group average overcharges to all transactions within groups. Yet, as I discuss below, the vast majority of purported explained variation is accounted for not by explaining the variation in prices, but by forcing the regression to determine constant fixed relationships ("fixed effect" – see note 138 above) between titles' prices.

- a) Figure 26 shows the extent of churning within Prof. Noll's top ten groups by volume. This figure takes every pair of titles in each of Prof. Noll's top selling groups, determines whether there are at least 36 overlapping price observations for that pair of titles, and then calculates a correlation coefficient for that title-pair. As discussed in Section IV above, minimal churning arises when two prices are perfectly correlated: the two prices always move up and down together, albeit perhaps by different amounts. On the other hand, churning increases as the prices' correlation moves away from a correlation of 1.0, leaving no discernible pattern at a correlation of zero, and reaching a situation of matching opposite movement when correlation reaches -1.0.
- b) Figures 26 and 25A-25B indicate that Prof. Noll's attempt to control for price variations and movements with "measurable and systematic factors" (as the ABA puts it¹⁴²) has not accounted for the churning of e-book titles prices and has not solved the problem that plagues demonstration of common impact "when the prices of some customers are going up while the prices for other customers are not".¹⁴³

124. To understand why we see such variegated movements in prices across titles even after Prof. Noll has attempted to account for factors and characteristics that might be hoped to be common within his different groupings, it is useful to examine titles that share the same values for Prof. Noll's "hedonic" variables. In Figure 27, I show the actual titles of 20 of the more than 1,950 e-book titles in Prof. Noll's four-week average price for his largest grouping (Group 1 in Figure 24, discussed above) in December 2010. Each of these titles is represented as sharing the attributes that Prof. Noll could measure using "measurable and systematic" data. These attributes are: "Fiction," published by Penguin, having been released for at least one year, and for which there are both hardcover and paperback versions, neither of which achieved New York Times bestseller status.

- a) Consideration of the titles and genre designations in light of the extreme heterogeneity of Prof. Noll's designation of "Fiction" in Figure 23 and the composition of the sub-genres that are encompassed under that designation (from Figure 1, discussed above) leads to the conclusion that the many hundreds of titles in this grouping in only one four-week period (December 2010) are too diverse to reasonably be expected to share pricing behavior.

¹⁴² ABA Section of Antitrust Law (2005) at 210-211. See discussion in Section IV above.

¹⁴³ ABA Section of Antitrust Law (2005) at 210.

- b) We would reasonably expect that a viable model of e-book pricing that could hope to account for the factors that would control for normal churning and reliably isolate the impact, if any, of the unlawful conduct on the members of the proposed class from churning potentially created by *not common* impacts of the unlawful conduct would have to begin with the examination of information on the kinds of hedonic factors that Prof. Noll's modeling fails to account for. Doing so would be expected to require individualized inquiry and data collection regarding more finely specified attributes of individual titles, focusing on factors noted above, including: Authors' growing or shrinking reputations, the appearance of good or bad reviews, events such as a movie release of the title, so-called "buzz" and "word-of-mouth" effects, celebrity, expert or other endorsements, and real-time advertising and other marketing efforts by retailers, authors, and/or publishers, etc.
- c) Such pertinent information is missing from Prof. Noll's analysis. Instead, he has aggregated large numbers of titles into groupings based upon his quite limited set of hedonic variables. Few consumers, for example, would be expected to purchase an e-book title because it is a "Fiction" title published by Penguin, is out in hardcover and paperback versions that are not New York Times bestsellers, and has been out for at least a year *and* to consider all other "Fiction" titles published by Penguin with the same list of characteristics as reasonably substitutable. But according to Prof. Noll's framework, once he controls for his list of characteristics, the titles should share the same common movement in prices, including a common response to the shift from wholesale to agency marketing accomplished via unlawful means. This assumption of the framework is squarely rejected by the analysis of Prof. Noll's damages modeling discussed above (see again Figures 23 through 27).

E. Prof. Noll's But-For Prices

125. As noted above, Prof. Noll's model treats all of the titles' prices in any one of his groupings and all of the purchases in that group regardless of title and time of purchase as identical for purposes of applying what his calculations yield as a group's average overcharge percentage. Thus, for example, for any purchase priced at \$29.99 in Figure 27 through to any purchase priced at \$0.95 in Figure 27, Prof. Noll's analysis assigns each title in the same grouping the same 25% overcharge. Thus, each title listed in this figure has a but-for four-week average price in December 2010 that is simply 25% below Prof. Noll's four-week average of actual prices for that title. Moreover, when it comes to the claimed damages to any individual class member, and each class member transaction subsumed by the titles in Figure 27 has a transaction-specific but-for price that is simply 25% below the price actually paid by the class member.

126. This same methodology of shifting actual transaction prices down by a calculated group average overcharge percentage is applied to any e-book purchase from a Publisher Defendant by a proposed class member which took place at any time during the damages period. As we have seen in the discussion of Figures 10, 11, 14A, 15A, 18A-18K, this creates the requirement of a panoply of methodologically unjustified “just so” stories within Prof. Noll’s framework: “It just so happens that, but for the unlawful conduct, Amazon was about to lower the prices of numerous titles on April 3, 2010, and it just so happens that the amount of Amazon’s but-for price reduction was precisely offset by the price-elevating effect of the unlawful conduct so that we didn’t observe any price change at all on April 3, 2010”; etc.
127. The problem plaguing Prof. Noll’s methodology of assigning a but-for price to a title that was purchased during the agency period is acutely demonstrable for e-book titles which were first released after the onset of agency. While Prof. Noll’s methodology uses an e-book’s average prices across transactions prior to agency to assist him in estimating what that title’s *average* prices would have been in the absence of the unlawful conduct, there are no such prices for titles that were published after the onset of agency. The magnitude of this problem cannot be ignored. Of the approximately 277,000 titles that were published by Publisher Defendants and purchased during the agency period, roughly 69,000 titles were published by Publisher Defendants after the onset of agency, accounting for nearly 59.8 million of Publisher Defendants’ e-book transactions during the agency period.
- a) How does Prof. Noll’s methodology handle titles that were published by Publisher Defendants after the onset of agency? Prof. Noll’s methodology predicts an *average* but-for price for these titles by relying again on his hedonic variables in an attempt to find other titles which he assumes are sufficiently representative of the titles for which the data record no pre-agency price. The only variables he has with which to make such a determination are those six which define his groupings (i.e., his aggregated genre designations, publisher, New York Times bestseller status, presence of a hardcover and/or paperback version, and time since release).
 - b) In effect, then, Prof. Noll’s methodology simply assigns the price of a title that began publishing after the onset of agency to one of his groupings and assumes that the title’s price experienced the same average overcharge percentage that every other title’s price and transaction in that group is assumed to have experienced. No mechanism exists in the framework by which to actually specify or estimate but-for prices for the numerous specific titles and purchases of e-books that were released after the onset of agency marketing.

- c) Moreover, we saw in Figures 18A-K that the distribution of initial prices for newly released titles after the onset of agency generally spanned all or much of the distribution observed before agency. Prof. Noll's framework contains no means by which to distinguish whether the initial price of any title released post-agency came from a distribution of conspiracy-free prices of the type seen before agency or, instead, came from the distribution of prices he asserts was pushed up by the unlawful conduct at the moment agency marketing commenced. The but-for prices that Prof. Noll assigns to e-book titles are not methodologically or numerically reliable, and clearly so for those titles which were released during the claimed damages period.

F. Prof. Noll's "Common Overcharge" and His "Just So" Methodology

128. The scientific method rests upon the testing of propositions that are put forth as true and rejecting those that do not comport with evidence. Yet, in asserting that his analysis shows common impact across the proposed class, Prof. Noll has not subjected his but-for prices for class members' actual purchases to rigorous scientific examination and verification. Indeed, by focusing on very broad group averages and four-week average prices, his framework lacks any means of doing other than assuming that average overcharges apply commonly to the large number of individual e-book titles and consumer purchases that makeup his averages.
129. Heuristically, Prof. Noll's framework *assumes* the kind of perfect mapping of individual titles' prices from actual to but-for levels shown in the left-hand column of Figure 22, but it actually cannot tell whether it is in the left-hand column of "perfect mapping" or in some variant of the turbulent middle and right-hand columns of Figure 22. As we have seen, the demonstrable churning and dispersion of prices that we see in e-book prices even after Prof. Noll has attempted to group titles and account for common factors that might affect a group's prices (e.g., Figures 25A-25B, Figure 26), do not support the conclusion that we are in the left-hand column of "perfect mapping" in Figure 22. That is, the data do not support Prof. Noll's assumption that group average overcharges apply commonly to the titles, much less the transactions, in his respective groups.
130. As stressed in Section IV above, Prof. Noll's assertion (assumption) of uniform, common impacts of the unlawful conduct on Publisher Defendants' e-book prices from the moment agency marketing began faces wholly implausible implications when we consider the many titles that did not see their prices increase at that moment. The proffered conclusions regarding common impact in such cases require invention of *ad hoc*, "just so" stories: It "just so" happens that on April 3, 2010, if Publisher Defendants had not implemented agency marketing, e-book transactions prices would have been

lowered by all wholesale-based retailers. The nature of these “just so” stories can be illustrated with the specific but-for-agency prices that are generated by Prof. Noll’s framework.

131. Figures 28A-28C, 29A-29C, 30A-30C, and 31A-31C show the nature of the “just so” stories required by Prof. Noll’s calculations. Each figure focuses on a single title sold at a given retailer. Each green “x” marks the price recorded for each transaction of that title and each pink “o” marks the predicted but-for price that Prof. Noll’s framework assigns to that transaction. In each of these figures, the vertical line labeled “Agency” marks the date when agency marketing began for the Publisher Defendant that published the title whose prices are presented. Transactions to the left of the “Agency” line occurred before the onset of agency marketing and, thus, Prof. Noll’s but-for prices are the same as actual transaction prices because there is no unlawful conduct during that time period. To the right of the “Agency” line, we see that Prof. Noll’s framework (as implemented in his workpapers) assigns each transaction a but-for price that is below what the consumer actually paid. The vertical difference between any green “x” and its corresponding lower pink “o” is the overcharge that Prof. Noll’s methodology estimates for that e-book. These overcharges do not change for a title unless a title’s hedonic variables indicate that it is in a different grouping which may occur, for example, if a title becomes a New York Times Bestseller (see Appendix A).

a) Figures 28A-28C and 29A-29C focus on specific titles (counted in Figures 19A-19E) whose prices stayed at or below their pre-agency price for at least the indicated period following the onset of agency marketing. Figure 28A, for example, shows the implication of Prof. Noll’s predicted but-for prices in the case of *Guardian of the Horizon* (published by HarperCollins). As the figure shows, the transaction prices for this title on Amazon were \$7.99 before agency and \$7.99 after the onset of agency.

(1) According to Prof. Noll’s analysis, immediately upon agency marketing (and despite no examination of the issue for any title), but-for the unlawful conduct the transaction prices for *Guardian of the Horizon* would have fallen to the level indicated by each pink “o” – even though the actual transaction prices we see for this title did not change at all relative to their pre-agency levels.

(2) Acceptance of the indicated but-for prices and the damages they imply requires an *ad hoc*, “just so” story to the effect that, in a world in which agency marketing was not implemented and Amazon simply continued to operate on the wholesale model, Amazon was going to lower its retail price of *Guardian of the Horizon* on April 3, 2010 and beyond. Moreover, so the story goes,

the amount of this price reduction was going to be precisely the amount that Prof. Noll would later calculate, in the other direction, of the price-increasing effect that the unlawful conduct turned out to have on the title's price, and this explains why we did not see actual prices decline with agency. Prof. Noll's framework and analyses contain no information or reliable bases that would support such a story. It is an *ad hoc* story required by the methodology.

- b) As another example, Figure 29A generates a similarly methodologically untenable "just so" story. The figure shows the pricing before and upon the onset of agency marketing by HarperCollins, the publisher of *The Shark Mutiny*. As the figure shows, the actual observed transaction prices for this title are slightly below \$9.99 before agency and then fall to \$7.99 after the onset of agency.
 - (1) According to Prof. Noll's calculations, immediately upon agency, but-for the unlawful conduct the transaction prices for this title would have fallen *even further* – to the level indicated by each pink "o". Thus, in this kind of case, we are able to observe falling actual prices because it just so happens that the publisher operating under unlawfully implemented agency marketing saw it in its interest to lower the price of *The Shark Mutiny* from the price that Amazon was charging immediately before April 3, 2010. However, so the story goes, if Amazon had continued on wholesale marketing with Publisher Defendants, Amazon would have lowered the price even more and held it lower from April 3rd onward.
 - (2) Again, Prof. Noll's framework and analyses contain no information or reliable bases for such a story.
- c) Figures 30A-30C and 31A-31C focus on specific titles whose prices rose above their pre-agency price in the five months following the onset of agency marketing. Figure 30A, for example, shows the implication of Prof. Noll's predicted but-for prices in the case of *The Deep End of Fear* (published by Simon & Schuster). As the figure shows, the transaction prices for this title on Amazon were rising before agency and rose again shortly after the onset of agency.
 - (1) According to Prof. Noll's calculations of the but-for prices for *The Deep End of Fear*, but-for the unlawful conduct the transaction prices for this title would have risen upon agency (to the pink "o's"), but just not as much as they actually rose.
 - (2) In this case, the "just so" story is that it just so happens that in the world in which the unlawful shift to agency never occurred and

Amazon continued to operate on the wholesale marketing model, something about market forces was just about to trigger an increase in the price of *The Deep End of Fear* by Amazon in April 2010. Nevertheless, so the story goes, while normal market forces were pushing prices upward, the increase we were able to observe – the increase pursuant to shifting pricing authority to Simon & Schuster – was greater than what those market forces justified and greater than what Amazon would have implemented under wholesale marketing. Prof. Noll’s framework and analyses contain no information or reliable bases for such a story.

- d) Finally, Figure 31A shows the example of *The Real America* (published by Simon & Schuster). In this case, the transaction prices for this title are at approximately \$9.99 on Amazon before agency and then rise to approximately \$11.99 after the onset of agency.
 - (1) According to Prof. Noll’s analysis, but for the unlawful conduct, the prices for *The Real America* would have fallen to the level indicated by each pink “o” – Prof. Noll’s but-for price. The accompanying “just so” story is that in the world of continued wholesale marketing, normal market forces were pressuring Amazon to the point that it would have lowered its price of the title if the unlawful conduct had not resulted in Simon & Schuster moving prices in opposition to the pressure of normal market forces.
 - (2) Because his very *methodology* assumes this story and contains no information or bases for assessing its accuracy, his framework’s but-for prices and damages are unreliable.
- e) Moreover, in this case (and in the vast majority of his but-for predictions), Dr. Noll’s calculation of common overcharges does not coincide with – and, in fact, contradicts – Plaintiffs’ theory that in the absence of the alleged conspiracy, an “industry standard \$9.99 price point” would have prevailed.¹⁴⁴ Indeed, Dr. Noll indicates that he does not know how many predicted but-for prices in his model are \$9.99, and does not “care to know” the percentage of them that are predicted to be \$9.99.¹⁴⁵

¹⁴⁴ Amended Complaint at ¶13.

¹⁴⁵ Noll Deposition at 183:6-11; 185:19-23.

G. Is Prof. Noll's Model Able to Reliably Identify the Fact and Magnitude of Damages for Individual E-book Buyers?

132. Prof. Noll indicates that he believes that his reduced-form pricing model of e-book prices, with its indicators as to whether and how much the within-group averages of four-week average title prices changed upon the shift to agency, yields reliable measures of the fact and magnitude of overcharges attributable to the unlawful conduct. He argues that “the regression equation has good fit”,¹⁴⁶ reporting that the “equation has an adjusted R^2 of 0.90, which means that the model explains 90 percent of the variance in prices among e-book titles”.¹⁴⁷ In making these claims, Prof. Noll has failed to follow textbook practice for the kind of modeling he has done.
133. Although Prof. Noll reports that his “equation has an adjusted R^2 is 0.90,” this is the result of his analysis’ reliance on the use of so-called “fixed effects” when estimating his reduced-form pricing model. As discussed above, these fixed effects are effectively dummy variables (i.e., on/off indicators) that force the model to calculate an average, constant relationship between one retailer-title’s four-week average prices and all other retailer-title’s prices. Although the inclusion of such “fixed effects” raise the “ R^2 ” statistic cited by Prof. Noll (i.e., the measure of how well the modeler’s equation fits the data), they are, in fact, an implicit admission by the modeler that he or she does not know what explains the variability in the observed data (e.g., titles’ prices’ dispersion and churning in the case of Prof. Noll’s analysis). Instead, the fixed effects simply force the model to accept and treat as different this unit of observation (e.g., a given retailer-title’s prices) from that unit of observation. In short, Prof. Noll’s inclusion of millions of fixed effects does not actually improve his reduced-form model’s ability to explain the matter of interest – i.e., the variation and churning of e-book prices. Instead, his approach simply acknowledges what we saw in Section III – i.e., one title differs from another. This is not explanation.
134. By effectively employing dummy (on/off) variables to account for his fixed effects (constant differences across retailer-titles) and then claiming that his modeling has been successful at actually explaining e-book prices, Prof. Noll is at odds with standards recognized in econometrics (the application of statistics to economic issues). As one introductory text puts it: “The R-squared from the dummy variable [fixed effects] regression is usually rather high. This occurs because we are including a dummy variable for each cross-

¹⁴⁶ Noll Declaration at fn. 21.

¹⁴⁷ Noll Declaration at page 24.

sectional unit [retailer-title, in our case], which explains much of the variation in the data.... We should not get too excited about this large R-squared.”¹⁴⁸ Moreover, the text uses what is known as the “within R-squared” to measure how well a fixed-effects model actually explains the data.¹⁴⁹

- a) Applied here, the within R-squared measures how well Prof. Noll’s model measures observed variation of e-book prices “within” a retailer-title. The computer modeling system, STATA, used by Prof. Noll does not report the R-squared cited by Prof. Noll in its standard output for the computer command that his code issues. Apparently, Prof. Noll had to instruct the system to report his figure of .90. The within R-squared of his model is strikingly lower, at 0.12. By this measure, his model only explains 12% of (within-title/retailer) the variation in e-book prices.
- b) This within R-squared has significant implications for the reliability of Plaintiffs’ expert’s percent overcharge. As I explain in Appendix A, Prof. Noll’s overcharge percentage does not make use of the “fixed effects” that increase his R^2 to 0.90. Instead, the “fixed effects” mathematically have no impact on the overcharge percentage once he has estimated his model. Thus, the appropriate statistical measure of how reliably Prof. Noll’s analysis has measured individual damages is properly the within R-squared of 0.12. This is telling us that the model is doing a relatively poor job of accounting for what determines and moves e-book prices. This means that there are factors that determine and move e-book prices which are beyond the lawful and unlawful supply and demand forces that Prof. Noll has attempted to measure and which are left out of his modeling.
- c) Moreover, the demonstrable dispersion and churning of titles’ and transactions’ prices, and the model’s demonstrable inability to control for that dispersion and churning, indicates that the factors left out of the modeling are the kinds of supply and demand forces discussed above that operate at the not-average level of specific titles, retailers and transactions (including, for example, authors’ growing or shrinking reputations, the appearance of good or bad reviews, events such as a movie release of the title, so-called “buzz” and “word-of-mouth” effects, celebrity, expert or other endorsements, and real-time advertising and other marketing efforts by retailers, authors and/or

¹⁴⁸ Wooldridge, Jeffrey M., *Introductory Econometrics: A Modern Approach* (Mason, OH: Thomson South-Western, 2013), (“Wooldridge 2013”) at 488-489.

¹⁴⁹ Wooldridge 2013 at 487.

publishers). As noted above, accounting for these forces would reasonably be expected to require the kind of individualized inquiry that class certification would assume to be unnecessary.

135. Arguably more troubling for the reliability of results and claims than the low explanatory power of Prof. Noll's modeling is the assumption of common impact that is built into the model's very structure. As I discuss in Appendix A, the technical or mathematical way in which this occurs is by constraining the model such that its calculated group-specific overcharge cannot be offset for any within-group price observation by any failure of the model to fully explain individual retailer-title four-week average prices. In other words, the modeling simply *assumes* that whatever it cannot explain (the "foam on the sea", as reflected in the model's prediction errors, imperfect "fit", and unaccounted for price movements) must be due to other than the unlawful conduct and that it has at least perfectly isolated the effects of that unlawful conduct.

- a) The consequences are that: (1) individual title overcharges can only be equal to the calculated group overcharge (common impact), and (2) with the putative effects of the unlawful conduct assumed to be perfectly isolated, all that remain in the model's unexplained portions of prices (errors) are the effects of, albeit unaccounted for, lawful forces. In other words, any unexplained dispersion and churning in prices would be just foam on the sea with or without the unlawful conduct, and the kind of concern expressed by the ABA when price volatility across the members of a class is present could be ignored
- b) These implications are overturned if the model has, in fact, (1) not perfectly isolated the effects on prices of the unlawful conduct from the other forces that affect prices, and (2) if economic factors apart from the unlawful conduct have changed the competitive dynamic in the claimed damages period relative to the prior period such that the unexplained portions of *lawfully* determined prices in the agency period (i.e., prices free of the effects of unlawful conduct, which are assumed to be perfectly isolated) are not, in fact, the same as those arising in the prior period.
- c) That the model has not perfectly isolated the effects on prices of the unlawful conduct from the other forces that affect prices is seen in the discussion above of the incoherence and need for "just so" stories that plague Prof. Noll's but-for prices. And the assumption of unchanged, albeit unaccounted for, *lawful* competitive dynamics across the pre-and post-agency periods is directly challenged by the kinds of factors discussed in Section III above, including the introduction of increasing numbers and increasing quality of e-readers, the consumer familiarity

with and engagement with the e-reading experience, the independent spread of self-publishing, and the like. The foam on the sea would be expected to be roiled by such dynamics.

136. If Prof. Noll's modeling has been successful in isolating the effects of the unlawful conduct, and if underlying lawful competitive dynamics have not changed over the pre-agency through post-agency span, Prof. Noll's predicted but-for prices should be putatively free of any impact of the unlawful conduct and would reasonably be expected to closely resemble prices in the pre-agency period (also taken to be free of unlawful conduct).

- a) Figures 32A-32J show the distribution of transaction prices that e-book consumers paid prior to agency marketing in red and the distribution of those transaction prices net of Prof. Noll's overcharge amount in blue for each of Prof. Noll's top ten groupings in Figure 24. Figures 32A-32J show markedly different distributions of actual pre-agency and Prof. Noll's post-agency but-for prices. If the latter are truly *but-for* in the sense that they have been rid of the effects of the unlawful conduct, the different pre- and post-agency distributions indicate that the model is not explaining the same underlying lawful, competitive environment.
- b) This supports the conclusion that underlying lawful competitive forces were not the same – as assumed in Prof. Noll's modeling – pre- and post-agency. The structural assumption undergirding the model's purported determination of common impact is not borne out in these data.

137. To further investigate how reliably Prof. Noll's damages model isolates the movements in prices, if any, that resulted from the unlawful conduct, I have compared how well his model predicts prices in the pre-April 2010 period with how well it predicts prices in and after April 2010. The results are shown in Figure 33.

- a) Figure 33 shows the distributions of Prof. Noll's model's prediction errors at his four-week averaged level for e-book transactions that occurred before March 28, 2010, (the red bars) and after April 3, 2010 (the blue bars).¹⁵⁰ If Prof. Noll's model has reliably isolated a common impact of the unlawful conduct from both average and individual title prices and underlying lawful competitive dynamics have not changed, then the pattern of the model's ability to predict e-book prices (as evidenced by the distribution of prediction errors) should not differ

¹⁵⁰ Prof. Noll excludes March 28, 2010, through April 3, 2010, from his damages estimation.

between the period before March 28, 2010, and the period after April 3, 2010. The two distributions (red and blue) should be closely matched. The foam on the sea ought to be essentially the same.

- b) Figure 33 contradicts the hypothesis that the two distributions are the same. Of course, the discussion above of, for example, Figures 18A-18K would lead us to expect this result: The conclusion to be drawn is that any movements in e-book prices that resulted from the unlawful conduct have not been reliably separated by Prof. Noll's modeling from legitimate movements in prices. Because reliable damage calculations require isolation of the effect of unlawful conduct, this means that Prof. Noll's calculations are not reliable.

138. As discussed above, the *assumption* that generates the kind of perfect mapping of each transaction from actual price to but-for price that we see in the left-hand column of Figure 22 (see discussion above) is that the true prediction errors for but-for prices *if we could observe them* would be identical to the prediction errors for prices e-book consumers actually paid.¹⁵¹ That is, any unexplained movement and churning of prices could then be treated as so much foam on top of the sea, independent of any unlawful conduct. This *assumption* is both methodological error and the foregoing analyses tell us it is rejected by the data.

- a) It is telling that, even under the assumptions of common impact built into Prof. Noll's modeling and unlawful conduct hypothesized by Plaintiffs and Prof. Noll to have taken the form of a conspiracy to raise all e-book prices sold by the Publisher Defendants, Prof. Noll's own results find that hundreds of thousands of transactions inexplicably "escaped" the effects of the unlawful conduct.
- b) Specifically, the first column of figures in Figure 34A shows Prof. Noll's model's frequency, measured in share of e-book sales, of instances in which a title's actual four-week average price was less than the model's calculation of that title's but-for four-week average price. According to Prof. Noll, when this occurs, no fact of injury or damages were borne by the pertinent consumers.¹⁵² Approximately 700,000 transactions fall into this group according to Prof. Noll. (See Figure 35A.) These results flow directly from Prof. Noll's calculations and arise under his assumptions.

¹⁵¹ See Appendix A – Mathematical Appendix.

¹⁵² See, for example, Noll Declaration at 26.

- c) The noted 700,000 transactions arise when we compare Prof. Noll's four-week average title prices to his but-for four-week average prices. The use of averaging here, however, obscures variations of individual transaction prices around Prof. Noll's averages. His underlying calculation methodology, employing his perfect mapping assumption, permits the calculation of individual transactions' but-for prices. Continuing to accept Prof. Noll's model on its own terms for the sake of analysis, Figure 34B reports the number of transactions for which his method of calculation yields but-for individual transaction prices which are less than the prices class members actually paid. As can be seen, Prof. Noll's own calculation methodology thus finds that more than 10.8 million transactions inexplicably escaped the claimed common injurious impact of the unlawful conduct. Again, this does not necessarily indicate that the affected consumers benefitted in these 10.8 million transactions. The existence of no injury where the model and the theory of the unlawful conduct predict we should find common impact provides a measure of the model's and/or the theory's unreliability.

139. Let us now accept all other aspects of Prof. Noll's framework (from the need for "just so" rationalization to the dealing entirely with averages) and ask how many transactions his calculations report as having been subject to overcharge purely as a result of the model's structural assumption of perfect mapping (i.e., that the true prediction errors for but-for prices if we could observe them would be identical to the prediction errors for prices e-book consumers actually paid). I investigate this in the last four columns of Figure 34A.

- a) In this figure, I gradually relax the Prof. Noll's assumption (unsupported by the data; see above) of identical but-for and actual price structures. In the last column of Figure 34A, I calculate but-for four-week average title prices using the actual prediction errors (residuals) that arise in Prof. Noll's model results for the pre-agency period.¹⁵³ These represent a viable measure for this purpose since they are estimated with a very large sample and are purported to be free of unlawful conduct – just as the unexplained portion of true but-for prices would be if they could be observed. The second, third and fourth columns of figures in Figure 34A employ versions of the assumed price structure that lie between Prof. Noll's assumption of identical but-for

¹⁵³ When employing logarithmic values for the variable being explained, the residual is employed in calculating predicted values of the variable. See Appendix A - Mathematical Appendix and Woodlridge 2013 at 212-213.

and actual structures and the fifth column's observed price structure from the pre-agency period.

- b) As we can see, relaxing Prof. Noll's untested and unsupported assumption of "perfect mapping" *per* the left-hand column of Figure 22 and Figure 34A result in steadily increasing numbers of transactions that have four-week average prices during agency which are below calculated but-for prices – indicating no fact of injury according to Prof. Noll.¹⁵⁴ In fact, under the "actual mapping" implied by the actual price structure in the pre-agency setting of lawful conduct, almost 16% of e-books sold by Publisher Defendants during the claimed damages period, accounting for approximately 24 million consumer transactions, are found to have no injury. All but approximately 700,000 of these represent a form of "false positives" in that they are reported by Prof. Noll as having borne overcharges when, in fact, there is no reliable basis in his modeling for doing so.

140. The existence of class-member transactions during agency that have actual transaction prices which were lower than the but-for prices generated by Prof. Noll's model point to the existence of some number of similar transactions that have actual prices greater than calculated but-for prices, but not reliably so.

- a) I examine this issue in Figures 35A and 35B. The first two columns of Figure 35A repeat the corresponding columns of Figure 34A – i.e., Prof. Noll's reported instances of no injury. To avoid false positives, we would like to avoid reporting as injured those instances that cannot be said to show *reliable* existence and quantum of injury. Noting, as above, that the model's prediction errors are employed in calculating predicted but-for prices, we can calculate the but-for four-week average title prices implied by Prof. Noll's modeling and its exclusive focus on group average effects.
- b) Specifically, the third and fourth columns of figures in Figure 35A recognize that Prof. Noll's modeling only provides explanation for group average effects and provides no explanation of within-group differences in individual titles' prices' movements.¹⁵⁵ Within this framework, then, we can apply the average (mean) prediction error that the model produces for a group to the group's individual titles since the absence of within-group title-specific information directs us to no other

¹⁵⁴ See Noll Declaration at 16.

¹⁵⁵ See discussion of Prof. Noll's fixed effects above.

specific value. To do this, the third column of numbers in the figure employs the actual prediction errors (residuals) for Prof. Noll's Publisher Defendant groupings as generated by his model over its entire pre- and post-agency time span. In the fourth column of numbers, I employ the model's prediction errors as generated in the pre-agency period of no unlawful conduct, again reflecting the reasoning that this period provides measures of prediction error that would putatively be representative of true but-for pricing (if we could observe it) in the damages period were it free of unlawful conduct.

- c) Calculating predicted but-for prices *per* the foregoing reasoning yields the third and fourth columns of numbers in Figure 35A. Specifically, following the logic of Prof. Noll's framework,¹⁵⁶ the calculated but-for four-week average title prices are compared to actual four-week average title prices. When the latter is below the former – actual is lower than but-for – there is no indication of injury. The totals in the last two columns of Figure 35A thus report the instances of transactions that Prof. Noll reports as subject to injury despite the absence of reliable evidence, plus the instances identified by Prof. Noll as not bearing injury (i.e., from the second column of numbers in Figure 35A). The conclusion to be drawn is that, properly reported, Prof. Noll's framework finds approximately 12.5 to 15 million transactions that contradict the claims of common adverse impact.
- d) Figure 35B repeats the exercise in Figure 35A, breaking out the results for each of the litigating jurisdictions and the group of non-litigating jurisdictions. The foregoing material conclusions continue to apply.

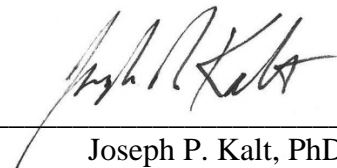
H. Summary

141. In this section, I have examined the modeling and calculations that generate Prof. Noll's aggregate damage figure and his conclusion that he has demonstrated a common fact of class-wide injury using a common formula. Notwithstanding ambiguity introduced by Prof. Noll's descriptions of his damages formula relative to the actual calculations he has relied upon, I find that the reduced-form pricing model that he has employed has fundamentally failed to solved the problems that are created for identification and quantification of a common class-wide fact of antitrust injury when prices are demonstrably dispersed and churning, leaving some consumers paying rising prices while other are paying falling prices.

¹⁵⁶ See, for example, Noll Declaration at 24-25.

142. I also have shown that Prof. Noll's conclusion that his modeling establishes a common fact of injury is actually an assumption of the modeling, not a result. The model focuses exclusively on aggregations and averages of large numbers of e-book titles and associated consumer transactions. Its mathematical structure then builds in the assumption that the model's calculated average overcharges must be the overcharges for each e-book title and transaction that go into group-average prices. This is not only methodologically improper; the assumption is contradicted by the evidence.
143. Finally, even taken on its own terms and employing Prof. Noll's measure and indicator of injury, Prof. Noll's framework generates millions of instances in which no injury is indicated and no reliable indication of injury is present. At its core, the proffered model fails to reliably identify the but-for prices that are needed for any reliable calculation of aggregate and individual damages.

I declare that the foregoing is true to the best of my knowledge and belief.



Joseph P. Kalt, PhD

Executed on November 15, 2013, in Boston, MA.

Appendix A – Mathematical Appendix

I. PROF. NOLL’S ESTIMATION OF DAMAGES

A. Prof. Noll’s “reduced-form” pricing model¹⁵⁷

1. Prof. Noll’s model uses a pricing “formula”¹⁵⁸ of the following form:

$$\log p_{i,t}^A = X_{i,t} \cdot \beta + d_{i,t} \cdot \delta_j + u_i + \varepsilon_{i,t}$$

- where i is a title at a given retailer, $\log p_{i,t}^A$ is the logarithm of Prof. Noll’s four-week average of observed transaction prices for i in a given four-week time period denoted by t (i.e., the actual price in Prof. Noll’s model); $X_{i,t}$ is the vector of control variables for i that may or may not vary over time; β is the vector of coefficients measuring the effect of $X_{i,t}$; $d_{i,t}$ is the indicator variable that takes the value of 1 when Prof. Noll asserts that $p_{i,t}^A$ is the result of the unlawful conduct and 0 otherwise; δ_j is the coefficient measuring the effect of $d_{i,t}$ (i.e., effect of the unlawful conduct on $\log p_{i,t}^A$) for all $\log p_{i,t}^A$ in the same group j ; u_i is an unobserved component of prices that is constant for each i (i.e., a “fixed effect”); and $\varepsilon_{i,t}$ is an idiosyncratic prediction error of i ’s price in time period t (i.e., the residual).
2. In Prof. Noll’s analysis the pricing formula above is estimated over his entire dataset, yielding separate estimates of δ_j for each grouping j (see Figures 24 in the body of my report).¹⁵⁹ I explain below how Prof. Noll’s calculations use this pricing model to estimate an average percent overcharge for each of his groups.
 3. Prof. Noll estimates his “reduced-form” pricing model via weighted ordinary least squares regression. Given that Prof. Noll’s model employs fixed effects, Prof. Noll’s estimation approach imposes the condition of strict exogeneity on the explanatory

¹⁵⁷ Noll Deposition at 60.

¹⁵⁸ See, e.g., Noll Declaration at 6, and Noll Deposition at 178-179.

¹⁵⁹ Prof. Noll’s groupings are defined by the unique combinations of his six hedonic variables: (1) the identity of the title’s publisher; (2) the genre category to which Prof. Noll assigns the title; (3) whether a hardcover version of the title is available; (4) whether a paperback version of the title is available; (5) New York Times bestseller status; and (6) how long the title has been released. Noll Declaration at 6, 17, 19-20.

variables given the fixed effect u_i : $E[\varepsilon_{i,t} | X_{i,t}, d_{i,t}, u_i] = 0$.¹⁶⁰ In words, Prof. Noll's approach assumes that the mean of the idiosyncratic prediction error, $\varepsilon_{i,t}$, is equal to 0 after his model accounts for the influence of his chosen explanatory variables.

B. Prof. Noll's Stated Damages Methodology

4. Prof. Noll states that his approach to measuring the damages is: "To calculate damages for a single sale of an e-book title during a particular four-week period when the collusive agency model was in force, I first use the regression model to calculate the 'but-for' price of each e-book title for each four-week period during the collusion period under the assumption that no price collusion had occurred. This calculation is performed by setting the indicator variable for price collusion equal to zero during the collusion period. I then calculate the difference between the actual price and the predicted competitive benchmark price for that book in that period."¹⁶¹
5. Thus, Prof. Noll's stated methodology entails, first, estimating his pricing "formula"¹⁶² (regression). Having thus obtained the regression's coefficients, he then calculates a predicted but-for price as the expected logarithmic price for i given the values of the explanatory variables for i except that the indicator variable $d_{i,t}$ is set to zero (thus, "predicting" what the logarithmic price would be had the title been priced without the unlawful conduct *assuming everything else remained the same*).¹⁶³ This assumption that everything else remained the same is critical, as I show below.
6. The mathematical form of Prof. Noll's expected logarithmic "predicted" price absent unlawful conduct within his framework is:¹⁶⁴

$$(1) \quad E[\log(p_{i,t}^A) | d_{i,t} = 0] = X_{i,t} \cdot \hat{\beta} + \hat{u}_i.$$

¹⁶⁰ Wooldridge, Jeffrey M., *Econometric Analysis of Cross Section and Panel Data* (Cambridge, MA: The MIT Press, 2002), at 266.

¹⁶¹ Noll Declaration at 24-25.

¹⁶² See, e.g., Noll Declaration at 6, and Noll Deposition at 178.

¹⁶³ Noll Declaration at 24-25.

¹⁶⁴ Prof. Noll's actual calculations (as distinct from his stated methodology; see below) drops the fixed effects when estimating his average percent overcharge in equation (4). I have included them here to demonstrate the impropriety of the assumptions Prof. Noll's analysis employs and the implications of those assumptions for his estimates of average percent overcharges within his framework.

7. Given the approach Prof. Noll has stated in his declaration¹⁶⁵ and deposition,¹⁶⁶ it immediately follows that Prof. Noll's stated damages are measured by:

$$(2) \quad \text{Prof. Noll's Stated Damages}_{i,t} = p_{i,t}^A - \hat{p}_{i,t}^{BF}$$

where $\hat{p}_{i,t}^{BF}$ is Prof. Noll's "predicted, but-for price" for i in time period t measured in dollars.

8. Prof. Noll's stated damages formula in equation (2) fails as a proper measure of damages. It treats price changes that his model does not explain by either normal supply and demand factors or "conspiracy" as nevertheless being damages caused by conspiracy. This follows immediately from:

$$(3) \quad p_{i,t}^A = \exp(X_{i,t} \cdot \hat{\beta} + d_{i,t} \cdot \hat{\delta}_j + \hat{u}_i) * \exp(\hat{\epsilon}_{i,t}).$$

9. Since damages within Prof. Noll's stated methodology are "the actual price minus the predicted, but-for price,"¹⁶⁷ and the actual price is made up of an explained part (i.e., $\exp(X_{i,t} \cdot \hat{\beta} + d_{i,t} \cdot \hat{\delta}_j + \hat{u}_i)$) and unexplained part (i.e., $\exp(\hat{\epsilon}_{i,t})$), the unexplained part of actual prices, *which the modeling tried, but failed, to explain by normal supply and demand factors and the unlawful conduct*, is a part of Prof. Noll's stated measure of damages purportedly due to the unlawful conduct. This is a logical contradiction: The subject portion of damages cannot be both caused by the unlawful conspiracy and unexplained by the unlawful conspiracy.

C. Prof. Noll's Workpapers Damages Methodology

10. The approach that Prof. Noll states that he has used is not the approach employed by Prof. Noll's analysis in his workpapers. Instead of implementing the invalid method that he describes in his declaration and deposition, Prof. Noll's analysis, in fact, estimates an average percent overcharge for all the observations in a given group based on the difference between predicted actual prices and but-for prices using the following equation:¹⁶⁸

¹⁶⁵ Noll Declaration at 6 and 24-25.

¹⁶⁶ See, e.g., Noll Deposition at 191.

¹⁶⁷ Noll Declaration at 6.

¹⁶⁸ See the file named "damages.do" in Prof. Noll's workpapers.

$$(4) \quad \text{Prof. Noll's percent overcharge}_{i,t} = \frac{\exp(X_{i,t} \cdot \hat{\beta} + d_{i,t} \cdot \hat{\delta}_j) - \exp(X_{i,t} \cdot \hat{\beta})}{\exp(X_{i,t} \cdot \hat{\beta} + d_{i,t} \cdot \hat{\delta}_j)} = 1 - \exp(-d_{i,t} \cdot \hat{\delta}_j)$$

where the first term in the numerator and the identical term in the denominator (before simplification) represents Prof. Noll's predicted actual price (given the values of the explanatory variables for i in time period t , including the indicator variable $d_{i,t}$) and the second term in the numerator (before simplification) represents Prof. Noll's predicted but-for price.

11. The predicted logarithmic actual price is given by:

$$(5) \quad E[\log(p_{i,t}^A)] = X_{i,t} \cdot \hat{\beta} + d_{i,t} \cdot \hat{\delta}_j + \hat{u}_i$$

We can note that the residuals are missing from both the predicted actual price and the predicted but-for price in equation (4). By using the average percent overcharge equation in (4), Prof. Noll's analysis assumes one of two things: (1) the residual can be ignored because it does not matter; or (2) the predicted value of the residual is identical for both the actual price and but-for price. Neither of these assumptions is justified. If Prof. Noll's analysis ignores the residual, then it is committing an error that undergraduate econometrics textbooks warn of when working with logarithmic prices and his estimates of overcharge are incorrect within his own framework.¹⁶⁹ If Prof. Noll's analysis assumes that the residual has the same predicted value for both the expected actual price and the expected but-for price, then it is making the explicit assumption, without any evidence, that prices absent the unlawful conduct differ from prices under the unlawful conduct only because of the effect of the unlawful conduct itself – thus, assuming what his analysis purports to prove.

12. To understand the impact of the error Prof. Noll's model commits, consider the putative overcharge percentage without making any assumptions:

$$(6) \quad \frac{\text{overcharge}}{\text{percentage}_{i,t}} = \frac{p_{i,t}^A - p_{i,t}^{BF}}{p_{i,t}^A}.$$

13. We can readily observe the actual price charged (i.e., $p_{i,t}^A$), but not the true but-for price absent the unlawful conduct (i.e., $p_{i,t}^{BF}$). Calculating the expected but-for price absent the unlawful conduct, $E(p_{i,t}^{BF})$, requires modeling prices absent the unlawful conduct (i.e., but-for prices) within Prof. Noll's framework. Given the way Prof.

¹⁶⁹ Wooldridge, Jeffrey M., *Introductory Econometrics: A Modern Approach*, 5th ed. (Mason, OH: South-Western, 2013), at 212-213.

Noll has modeled actual prices, the corresponding “reduced-form” pricing model for these prices would be:

$$\log p_{i,t}^{BF} = X_{i,t} \cdot \theta + v_i + \omega_{i,t}$$

where $\log p_{i,t}^{BF}$ is the logarithm of Prof. Noll’s four-week average price for i in a given four-week time period t absent the unlawful conduct if we could observe it (i.e., the true but-for price); $X_{i,t}$ is a vector of control variables for i that may or may not vary over time; θ is the coefficient measuring the effect of $X_{i,t}$; v_i is an unobserved component of prices that is constant for each i (i.e., the “fixed effect” absent the unlawful conduct); and $\omega_{i,t}$ is an idiosyncratic prediction error of i ’s price in time period t absent the unlawful conduct (i.e., the residual).

14. If we could observe true but-for prices, we could calculate the putative overcharge percentage within Prof. Noll’s framework, replacing the actual price with the expected actual price and the true but-for price with the expected but-for price, as:

$$(7) \quad \text{overcharge percentage}_{i,t} = \frac{\exp(X_{i,t} \cdot \hat{\beta} + d_{i,t} \cdot \hat{\delta}_j + \hat{u}_i) * E[\exp(\varepsilon_{i,t})] - \exp(X_{i,t} \cdot \hat{\theta} + \hat{v}_i) * E[\exp(\omega_{i,t})]}{\exp(X_{i,t} \cdot \hat{\beta} + d_{i,t} \cdot \hat{\delta}_j + \hat{u}_i) * E[\exp(\varepsilon_{i,t})]}$$

Notice that the estimated coefficients (i.e., $\hat{\beta}$ and $\hat{\theta}$) and fixed effects (i.e., \hat{u}_i and \hat{v}_i) are not necessarily identical for actual and but-for prices because the stochastic process underlying the actual and but-for prices may be different.

15. Even if we assume that Prof. Noll’s model has sufficiently isolated the movement in prices attributable to the unlawful conduct from the legitimate movement in prices, and that the estimated effects of the explanatory variables and fixed effects are identical across the actual and but-for prices (i.e., $\hat{\beta} = \hat{\theta}$ and $\hat{u}_i = \hat{v}_i$) (as Prof. Noll’s analysis does; see equations (1) and (5)), we still cannot conclude that Prof. Noll’s analysis is calculating the percent overcharge properly.
16. By applying these assumptions, the percent overcharge in Prof. Noll’s framework becomes:

$$(8) \quad \text{overcharge percentage}_{i,t} = 1 - \exp(-d_{i,t} \cdot \hat{\delta}_j) * \frac{E[\exp(\omega_{i,t})]}{E[\exp(\varepsilon_{i,t})]}$$

However, we cannot simply assume that the percent overcharge in equation (8) is the same as the percent overcharge in equation (4) that is used in Prof. Noll’s analysis. Such equality holds only if:

$$E[\exp(\omega_{i,t})] = E[\exp(\varepsilon_{i,t})],$$

which is the critical assumption built into the structure of Prof. Noll's framework. Since $d_{i,t} = 1$ for every i in a given group j at the same time (i.e., when the group goes to agency), this assumption eliminates any individual distinction in equation (8). In so doing, Prof. Noll's assumption forces a common impact of the unlawful conduct across all i in a given group j at time t . Prof. Noll's framework assumes what needs to be proven.

17. Rather than assume what needs to be proven, we must also consider the possibility that:

$$E[\exp(\omega_{i,t})] \neq E[\exp(\varepsilon_{i,t})].$$

18. Alternatively, if we use the actual price *per* Prof. Noll's stated damages methodology, Prof. Noll's overcharge formula reduces to:

$$(9) \quad \text{overcharge percentage}_{i,t} = 1 - \exp(-d_{i,t} \cdot \hat{\delta}_j) * \frac{E[\exp(\omega_{i,t})]}{\exp(\hat{\varepsilon}_{i,t})}.$$

$\hat{\varepsilon}_{i,t}$ is the observed residual – i.e., the part of the actual price that the model cannot explain. It is the difference between the actual price (in logarithms) and the expected actual price (in logarithms).

19. In order for (9) to match the overcharge percentage actually calculated by Prof. Noll in his workpapers, his stated methodology must assume in equation (9) that:

$$E[\exp(\omega_{i,t})] = \exp(\hat{\varepsilon}_{i,t}).$$

This corresponds to assuming that the unexplained portion of the price absent the unlawful conduct is identically equal to the portion of the actual price that is unexplained by the model. It also, as before, eliminates any individual distinction in equation (9). In so doing, such an assumption forces a common impact of the unlawful conduct across all i in a given group j at time t . In so doing, it assumes that which must be proven.

AMENDED

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Appendix B – Materials Relied Upon (Amended)

Legal Documents

Second Amended Complaint for Injunctive Relief, Civil Penalties & as *Parens Patriae* on Behalf of Consumers, *The State of Texas et al. v. Penguin Group (USA) Inc.; et al.*, No. 12-cv-3394 (DLC)

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Opinion & Order , *United States v. Apple*, No. 12-cv-2826 (DLC); *The State of Texas et al. v. Penguin Group (USA) Inc.; et al.*, Civil Action: No. 12-cv-03394 (DLC); (S.D.N.Y.), July 10, 2013

Declaration of John Lange in Support of Motion to Quash or Modify Subpoena Duces Tecum, *In Re Amazon.com*, No. 12-mc-00351-P1, October 5, 2012

Transcript of Hearing, *In Re Electronic Books Antitrust Litigation* Civil Action, No. 11-md-02293(DLC); *The State of Texas et al. v. Penguin Group (USA) Inc.; et al.*, No. 12-cv-03394, October 9, 2012

Testimony, Depositions, and Expert Reports

Corrected Declaration of Roger G. Noll, *In Re Electronic Books Antitrust Litigation*, Civil Action No. 11-md-02293(DLC); *The State of Texas et al. v. Penguin Group (USA) Inc.; et al.*, No. 12-cv-03394 (DLC), October 18, 2013, including figures and workpapers

Deposition of Roger G. Noll, *In Re Electronic Books Antitrust Litigation*, Civil Action No. 11-md-2293; *The State of Texas et al. v. Penguin Group (USA) Inc.; et al.*, No. 12-cv-03394, November 1, 2013

Direct Testimony of Russell C. Grandinetti, *United States of America v. Apple Inc.*, Civil Action No. 12-cv-2826 (DLC); *The State of Texas, et al., v. Penguin Group (USA) Inc., et al.*, Civil Action No. 12-cv-03394 (DLC)

Declaration of Jonathan Orszag, *In Re Electronic Books Antitrust Litigation*, Civil Action No. 11-md-2293; *The State of Texas et al. v. Penguin Group (USA) Inc.; et al.*, No. 112-cv-3394(DLC), November 15, 2013

AMENDED

B-2

Expert Report of Dr. Michelle Burtis on Behalf of Apple Inc., Holtzbrinck Publishers, LLC
D/B/A Macmillan and Penguin Group (USA) Inc. in *United States v. Apple*, No. 12-cv-2826
(DLC)

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AMZN-DOJ-002453-95

AMZN-TXCID-0000543-560

AMZN-TXCID-0003759-98

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APPLEBOOK00384755-384773

APPLEBOOK00384792-384806

APPLEBOOK00384807-384832

APPLEBOOK00384833-384848

BN0001092-1114

BN0001213-1251

BN0001536-1558

BN0001765-1782

BN00046926-46941

GOGEBKS-CP-0000697-713

GOGEBKS-TT-0015415-15437

GOGEBKS-TT-0042255-42275

GOGEBKS-TT-0055313-55332

HBG00245543-245556

HBG-HC-000001-18

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HBG-SOLE000004749-4773

HC-TXAG-0819175-819195

MAC0005592-5602

MAC0158458-158472

MCMLN0057926-57951

MCMLN-LIT-00321802-1847

PEN017162-17188

PEN-LIT-00000064-102

RH-USDOJ-00001427-1483

RH-USDOJ-00025408-25430

RH-USDOJ-00025445-25459

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Data

2010_ebooks.txt
 2011_ebooks.txt
 2012_ebooks.txt
 amazonold_weekly_mapped.sas7bdat
 amznew_weekly_mapped.sas7bdat
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 APLEXP00003
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 bam_weekly_mapped.sas7bdat
 bandn_weekly_mapped.sas7bdat
 CLSPLF0000005.xlsx
 Collapse_New_Data_by_Title_Price_for_Day.sas
 DRBD_Transactional_Records.tsv
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 eBook_Data_Build.sas
 ebook_eisbn_map.sas7bdat
 ebook_orders_2009.txt
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 eBookPrices.txt
 Ebooks+Data+(2008+-+2007)
 Ebooks+Data+(2009+-+2008)
 Ebooks+Data+(2010+-+2009)
 Ebooks+Data+(2011-2010)
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 GOGEBKS-001119.csv
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B-7

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ibook_extract_20120301_20120331.txt
ibook_extract_20120401_20120411.txt
Import_& Compilation_of_Google_Sales_Data.sas
Import_and_Aggregate.sas
Import_Apple_Data.sas
Import_Kindle_Catalog.sas
Import_Kindle_Catalog.sas
Import_New_Amazon_Print_Transaction_Data.sas
Import_Old_Amazon_Print_Transaction_Data.sas
Import_Old_Apple_Data.sas
kindle_book_catalog_v2.txt
Kobo_Inc_US_historical_sales_details_(comma_delimited).csv
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P2008.txt
P2009.txt

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B-8

P2010.txt
P2011.txt
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Pbook+Sales+Data+(2008)
Pbook+Sales+Data+(2009)
Pbook+Sales+Data+(2010)
Pbook+Sales+Data+(2011)
Pbook+Sales+Data+(2012)
product_ebooks.txt
Read_in_Kobo_Production.sas
SEL00000011_CONFIDENTIAL.csv - SEL00000025_CONFIDENTIAL.csv
Sony_New_Transaction_Data_Import.sas
Sony_Old_Transaction_Data_Import.sas
sony_weekly_mapped.sas7bdat
zip_code_database.csv

All materials cited in my declaration



Appendix C

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PROFESSIONAL POSITIONS

JOHN F. KENNEDY SCHOOL OF GOVERNMENT, HARVARD UNIVERSITY CAMBRIDGE, MA

Ford Foundation Professor of International Political Economy, 1992-2012; emeritus 2012-present

Areas of specialization include Industrial Organization, Economics of Antitrust and Regulation, Natural Resource Economics, Public Choice and Political Economy, Economic Development, Microeconomic Theory.

Co-Director, The Harvard Project on American Indian Economic Development, 1987-present

Faculty Chair, Harvard University Native American Program, 2000-2006

Chair, Economics and Quantitative Methods Cluster, 1995-2000

Professor of Political Economy, 1986-1992

Faculty Chair and Academic Dean for Research, 1992-1994

Chairman, Environment and Natural Resources Program, Center for Science and International Affairs, 1990-1994

Chairman of Degree Programs, 1990-1992

Chairman of Ph.D. Programs, 1989-1990

Assistant Director for Natural Resources, Energy and Environmental Policy Center, 1985-1990

Co-Director, Harvard Study on the Future of Natural Gas Policy (with Frank C. Schuller), Energy and Environmental Policy Center, 1984-1986

DEPARTMENT OF ECONOMICS, HARVARD UNIVERSITY, CAMBRIDGE, MA

Associate Professor of Economics, 1983-1986

Assistant Professor of Economics, 1980-1983

Instructor in Economics, 1978-1980

THE UNIVERSITY OF ARIZONA, TUCSON, AZ

Visiting Professor, Rogers College of Law, 2008-present

Visiting Professor, Eller College of Management, 2005-2010

Faculty Chair for Nation Building Programs, Native Nations Institute for Leadership, Management, and Policy, Udall Center for Studies in Public Policy, 2005-present

Visiting Professor, American Indian Studies Program, 2005-2006

COMPASS LEXECON

Senior Economist, 2003-present (and since 1983 with predecessor enterprises)

President's Council of Economic Advisers, Washington DC

Junior Staff Economist, 1974-1975

EDUCATION

University of California, Los Angeles, Ph.D. in Economics, 1980; M.A. in Economics, 1977
Doctoral Dissertation: *Federal Control of Petroleum Prices: A Case Study of the Theory of Regulation*

Stanford University, Stanford, CA, B.A. in Economics (Honors), 1973

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“The Apparent Ideological Behavior of Legislators: On-the-Job Consumption or Just a Residual?” (with Mark A. Zupan), *Journal of Law and Economics* 33 (April 1990), pp. 103-32.

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“The Impact of Domestic Environmental Regulatory Policy on U.S. International Competitiveness,” *International Competitiveness*, A.M. Spence and H.A. Hazard, eds., Ballinger Publishing Co., 1988.

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“Market Structure, Vertical Integration, and Long-Term Contracts in the (Partially) Deregulated Natural Gas Industry,” *Discussion Paper Series*, Harvard Institute of Economic Research, Harvard University, April 1985.

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“Television Industry Self-Regulation: Protecting Children from Competition in Broadcasting” (with George J. Holder), Harvard Institute of Economic Research, Discussion Paper No. 896, April 1982.

“The Use of Political Pressure as a Policy Tool During the 1979 Oil Supply Crisis” (with Stephen Erfle and John Pound), *Discussion Paper Series*, John F. Kennedy School of Government, Harvard University, April 1981.

“Problems of Minority Fuel Oil Dealers” (with Henry Lee), *Discussion Paper Series*, Energy and Environmental Policy Center, John F. Kennedy School of Government, Harvard University, April 1981.

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“Tucson must not become bottom feeder underneath Phoenix’s sprawl machine,” *Arizona Daily Star*, Opinion, May 28, 2010.

Statement to U.S. House of Representatives Committee on Appropriations, Subcommittee on Interior, Environment, and Related Agencies, *The State of Indian America*, March 13, 2007.

Statement to U.S. Senate Committee on Indian Affairs, *Lessons in Economic Development*, Hearings Regarding International Lessons in Economic Development, September 12, 2002 (hearings cancelled September 11, 2002); published in U.S. Senate Committee on Indian Affairs, *Forum on Establishing a Tribally Owned Development Corporation*, July 20, 2004.

“Institution Building: Organizing for Effective Management” in *Building Native Nations: Environment, Natural Resources, and Governance*, ed. by Stephanie Carroll Rainie, Udall Center for Studies in Public Policy, The University of Arizona, 2003.

Statement to U.S. House of Representatives Committee on Government Reform, Subcommittee for Energy Policy, Natural Resources and Regulatory Affairs, Hearings Regarding Natural Gas Capacity, Infrastructure Constraints, and Promotion of Healthy Natural Gas Markets, Especially in California, October 16, 2001.

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Foreword to *Impossible to Fail*, J.Y. Jones, Hillsboro Press, 1999.

Statement to U.S. House of Representatives, Subcommittee on Energy and Mineral Resources, *Federal Oil Royalty Valuation* (HB 3334), Hearing of May 21, 1998.

Statement to the National Gambling Impact Study Commission, *Economic Impact of Gaming by American Indian Tribes*, Hearing of March 16, 1998.

“Measures Against Tribes Are Counterproductive,” editorial (with Jonathan B. Taylor), *Indian Country Today*, September 22-29, 1997.

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“A Harvard Professor Looks at the Effects of Allowing U.S. Hunters to Import Polar Bear Trophies,” *Safari Times*, April 1994.

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“Staff Report on Effects of Restrictions on Advertising and Commercial Practice in the Professions: The Case of Optometry,” Ronald S. Bond, *et al.*, Executive Summary, Bureau of Economics, Federal Trade Commission, September 1980.

“Redistribution of Wealth in Federal Oil Policy,” *San Diego Business Journal*, August 18, 1980, pp. 22-23.

“The Energy Crisis—Moral Equivalent of Civil War” (with Peter Navarro), *Regulation*, January/February 1980, pp. 41-43.

“Windfall Profits Tax Will Reap Bonanza—But For Whom?” (with Peter Navarro), *The Miami Herald*, December 23, 1979, editorial page.

SELECTED PRESENTATIONS

“Indigenous Self-Government: The Political Economy of the Only Policy That Has Ever Worked,” Ministry of Business, Innovation and Employment, Government of New Zealand, Wellington, NZ, April 18, 2013.

“American Indian Self-Government: The Political Economy of a Policy That’s Worked,” Dean’s Distinguished Speakers Series, University of Auckland (NZ) Business School, April 16, 2013.

Keynote Address: “Harvesting Creosote to Build Houses: Is Arizona’s Economic Model Sustainable?” 96th Arizona Town Hall, Tucson, AZ, April 26, 2010.

Keynote Address: “Resurgence and Renaissance in Indian America,” Native American Business Association Annual Convention, Mississippi Choctaw Nation, April 29, 2008.

“Standard Oil to Today: Antitrust Enforcement in the Oil Industry,” American Bar Association, 56th Antitrust Law Spring Meeting, Washington, D.C., March 27, 2008.

Keynote Address: “Nation Building: Lessons from Indian Country,” National Native American Economic Policy Statement, Phoenix, AZ, May 15, 2007.

Keynote Address: “A Conversation on the State of the Native Nations: A Gathering of Leaders,” Res 2007, Las Vegas, NV, March 14, 2007.

“Foundations of Nation Building: The Roles of Culture, Institutions, & Leadership Among Contemporary American Indian Nations,” a lecture to faculty, staff and students, Marine Corps University, Quantico, VA, March 12, 2007.

Keynote Address: “The Universal Challenge of Nation Building,” First Annual Great Lakes Tribal Economic Development Symposium, Traverse City, MI, October 25-26, 2006.

Transcript of Keynote Address, “Setting the Agenda: What Will Drive Energy’s Future?” *Congressional Quarterly Forum*, “The Politics of Oil: U.S. Imperatives, Foreign Consequences,” Washington, D.C., September 13, 2005.

“The Role of the Tribal Courts and Economic Development,” Bureau of Indian Affairs, *Tribal Courts in the 21st Century*, Billings, MT, August 16, 2005.

“Linking Tribal Sovereignty to Economic Self-Determination in Indian Country,” *The Tribal Leaders Forum*, “Sovereignty in Crisis,” Las Vegas, NV, May 27, 2005.

“Competition and Regulation in the North American Electricity Industry: Can These Two Seemingly Opposed Forces Coexist?” (with Charles Augustine and Joseph Cavicchi), 24th Annual North American Conference, USAEE/IAEE, Energy, Environment, and Economics in a New Era, Washington, DC, July 8-10, 2004.

“The State of U.S. Railroads and the Challenges Ahead,” briefing of Capitol Hill staff, Association of American Railroads, April 17, 2003.

“The State of the Railroad Industry and the Challenges Ahead,” briefing of Roger Nober, Chairman, US Surface Transportation Board, Association of American Railroads, January 28, 2003.

“The Wealth of American Indian Nations: Culture and Institutions,” Federal Reserve Bank of Boston, December 11, 2002.

“The Roots of California’s Energy Crisis: Law, Policy, Politics, and Economics,” Regulation Seminar, Center for Business and Government, Kennedy School, Harvard University, November 7, 2002.

“Public Policy Foundations of Nation Building in Indian Country,” National Symposium on Legal Foundations of American Indian Self-Governance,” Mashantucket Pequot Nation, February 9, 2001.

“Twenty-Five Years of Self-Determination: Lessons from the Harvard Project on American Indian Economic Development,” Udall Center for Studies in Public Policy, University of Arizona, November 13-14, 1999.

Proceedings of the Fourth Annual DOE-NARUC Natural Gas Conference, Orlando, FL, February 1995.

Keynote Address, “Sovereignty and American Indian Economic Development,” Arizona Town Hall, Grand Canyon, AZ, October 1994.

“Is the Movement Toward a Less-Regulated, More Competitive LDC Sector Inexorable?, (Re)Inventing State/Federal Partnerships: Policies for Optimal Gas Use,” U.S. Department of Energy and The National Association of Regulatory Utility Commissioners Annual Conference, Nashville, TN, February 1994.

“Cultural Evolution and Constitutional Public Choice: Institutional Diversity and Economic Performance on American Indian Reservations,” Festschrift in Honor of Armen A. Alchian, Western Economic Association, Vancouver, BC, July 1994.

“Precedent and Legal Argument in U.S. Trade Policy: Do they Matter to the Political Economy of the Lumber Dispute?” National Bureau of Economic Research, Conference on Political Economy of Trade Protection, February, September 1994.

“The Redesign of Rate Structures and Capacity Auctioning in the Natural Gas Pipeline Industry,” Natural Gas Supply Association, Houston, TX, March 1988.

“Property Rights and American Indian Economic Development,” Pacific Research Institute Conference, Alexandria, VA, May 1987.

“The Development of Private Property Markets in Wilderness Recreation: An Assessment of the Policy of Self-Determination by American Indians,” Political Economy Research Center Conference, Big Sky, MT, December 4-7, 1985.

“Lessons from the U.S, Experience with Energy Price Regulation,” International Association of Energy Economists Delegation to the People’s Republic of China, Beijing and Shanghai, PRC, June 1985.

“The Impact of Domestic Regulation on the International Competitiveness of American Industry,” Harvard/NEC Conference on International Competition, Ft. Lauderdale, FL, March 7-9, 1985.

“The Welfare and Competitive Effects of Natural Gas Pricing,” American Economic Association Annual Meetings, December 1984.

“The Ideological Behavior of Legislators,” Stanford University Conference on the Political Economy of Public Policy, March 1984.

“Principal-Agent Slack in the Theory of Bureaucratic Behavior,” Columbia University Center for Law and Economic Studies, 1984.

“The Political Power of the Underground Coal Industry,” FTC Conference on the Strategic Use of Regulation, March 1984.

“Decontrolling Natural Gas Prices: The Intertemporal Implications of Theory,” International Association of Energy Economists Annual Meetings, Houston, TX, November 1981.

“The Role of Government and the Marketplace in the Production and Distribution of Energy,” Brown University Symposium on Energy and Economics, March 1981.

“A Political Pressure Theory of Oil Pricing,” Conference on New Strategies for Managing U.S. Oil Shortages, Yale University, November 1980.

“The Politics of Energy,” Eastern Economic Association Annual Meetings, 1977.

WORKSHOPS PRESENTED

University of Auckland; Ministry of Business, Innovation and Employment, Government of New Zealand; Federal Reserve Bank of Boston; University of Indiana; University of Montana; Oglala Lakota College; University of New Mexico; Columbia University Law School; Department of Economics and John F. Kennedy School of Government, Harvard University; MIT; University of Chicago; Duke University; University of Rochester; Yale University; Virginia Polytechnic Institute; U.S. Federal Trade Commission; University of Texas; University of Arizona; Federal Reserve Bank of Dallas; U.S. Department of Justice; Rice University; Washington University; University of Michigan; University of Saskatchewan; Montana State University; UCLA; University of Maryland; National Bureau of Economic Research; University of Southern California.

TEACHING

Markets and Market Failure with Cases (Harvard Kennedy School of Government, graduate); Native Americans in the 21st Century: Nation Building I & II (Harvard, University-wide, graduate and undergraduate); Competition, Strategy, and Regulation (Harvard Kennedy School of Government, graduate); Introduction to Nation Building/The Law, Policy, and Economics of Contemporary Tribal Economic Development (University of Arizona, School of Law and College of Management, graduate); Introduction to Environment and Natural Resource Policy (Harvard Kennedy School of Government, graduate); Seminar in Positive Political Economy (Harvard Kennedy School of Government, graduate); Intermediate Microeconomics for Public Policy (Harvard Kennedy School of Government, graduate); Natural Resources and Public Lands Policy (Harvard Kennedy School of Government, graduate); Economics of

Regulation and Antitrust (Harvard Department of Economics, graduate); Economics of Regulation (Harvard Department of Economics, undergraduate); Introduction to Energy and Environmental Policy (Harvard Kennedy School of Government, graduate); Graduate Seminar in Industrial Organization and Regulation (Harvard Department of Economics, graduate); Intermediate Microeconomics (Harvard Department of Economics, undergraduate); Principles of Economics (Harvard Department of Economics, undergraduate); Seminar in Energy and Environmental Policy (Harvard Kennedy School of Government, graduate)

OTHER PROFESSIONAL ACTIVITIES

Working Advisory Board, National Institute for Civil Discourse, 2011-present

Board of Directors, Sonoran Institute, 2008-present

National Advisory Board, Big Sky Institute, Montana State University, 2007-present

Board of Trustees, The Communications Institute, 2003-present

Board of Trustees, Fort Apache Heritage Foundation, 2000-present (Chair, 2010-present)

Mediator (with Keith G. Allred), Nez Perce Tribe and the North Central Idaho Jurisdictional Alliance, MOU signed December 2002

Mediator, *In the Matter of the White Mountain Apache Tribe v. United States Fish and Wildlife Service*, re: endangered species management authority, May-December, 1994

Steering Committee, National Park Service, 75th Anniversary Symposium, 1991-1993

Board of Trustees, Foundation for American Communications, 1989-2003

Editorial Board, *Economic Inquiry*, 1988-2002

Advisory Committee, Oak Ridge National Laboratory, Energy Division, 1987-1989

Commissioner, President's Aviation Safety Commission, 1987-1988

Principal Lecturer in the Program of Economics for Journalists, Foundation for American Communications, teaching economic principles to working journalists in the broadcast and print media, 1979-2000

Lecturer in the Economics Institute for Federal Administrative Law Judges, University of Miami School of Law, 1983-1991

Research Fellow, Energy and Environmental Policy Center, John F. Kennedy School of Government, Harvard University, 1981-1987

Editorial Board, MIT Press Series on *Regulation of Economic Activity*, 1984-1992

Research Advisory Committee, American Enterprise Institute, 1979-1985

Editor, *Quarterly Journal of Economics*, 1979-1984

Referee for *American Economic Review*, *Bell Journal of Economics*, *Economic Inquiry*, *Journal of Political Economy*, *Review of Economics and Statistics*, *Science Magazine*, *Journal of Policy Analysis and Management*, *Social Choice and Welfare*, *Quarterly Journal of Economics*, MIT Press, North-Holland Press, Harvard University Press, *American Indian Culture and Research Journal*

SELECTED HONORS AND AWARDS

Distinguished Visiting Professor, University of Auckland Business School, April 2013.

Public Sector Leadership Award, National Congress of American Indians, Washington, DC, March 1, 2010.

First American Public Policy Award, First American Leadership Awards 2005, "Realizing the Vision: Healthy Communities, Businesses, and Economies," National Center for American Indian Enterprise Development, Phoenix, AZ, June 9, 2005.

Allyn Young Prize for Excellence in the Teaching of the Principles of Economics, Harvard University, 1978-1979 and 1979-1980.

Chancellor's Intern Fellowship in Economics, September 1973 to July 1978, one of two awarded in 1973, University of California, Los Angeles.

Smith-Richardson Dissertation Fellowship in Political Economy, Foundation for Research in Economics and Education, June 1977 to September 1977, UCLA.

Summer Research Fellowship, UCLA Foundation, June 1976 to September 1976.

Dissertation Fellowship, Hoover Institution, Stanford University, September 1977 to June 1978.

Four years of undergraduate academic scholarships, 1969-1973; graduated with University Distinction and Departmental Honors, Stanford University.

Research funding sources have included: Annie E. Casey Foundation; Nathan Cummings Foundation; Department of Indian Affairs and Northern Development (Canada); National Indian Gaming Association; The National Science Foundation; USAID (IRIS Foundation); Pew Charitable Trust; Christian A. Johnson Family Endeavor Foundation; The Ford Foundation; The Kellogg Foundation; Harvard Program on the Environment; The Northwest Area Foundation; the U.S. Department of Energy; the Research Center for Managerial Economics and Public Policy, UCLA Graduate School of Management; the MIT Energy Laboratory; Harvard's Energy and Environmental Policy Center; the Political Economy Research Center; the Center for Economic Policy Research, Stanford University; the Federal Trade Commission; Resources for the Future; and The Rockefeller Foundation.

EXPERT TESTIMONY

Lao Holdings, N.V.

Lao Holdings, N.V., Claimant, v. The Government of the Lao People's Democratic Republic, Respondent, ICSID Case No. ARB/(AF)12/6, Witness Statement, July 22, 2013; Witness Statement, October 1, 2013.

Tri-State Generation and Transmission Association, Inc.

Before the Public Utility Commission of the State of Colorado, Docket No. 13F-0145E, La Plata Electric Association, Inc., et al. v. Tri-State Generation and Transmission Association, Inc., Witness Statement, July 5, 2013; Oral Testimony, August 1, 2013.

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In the United States District Court for the Central District of California, Western Division, AFMS, LLC v. United Parcel Service Company and FedEx Corporation, Expert Report, February 8, 2013.

BNSF Railway Company, CSX Transportation, Inc., Norfolk Southern Railway Company, and Union Pacific Railroad Company

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